

THE GENUS RUBUS (ROSACEAE) IN MALESIA

2. The subgenus *Malachobatus*

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SUMMARY

In subgenus *Malachobatus* twenty Malesian species are recognized, one of them (*Rubus moluccanus* L.) with four varieties. Synonymy, descriptions, habitat notes, etc. are given. New names: *R. moluccanus* L. var. *discolor* (Bl.) Kalkm. and var. *angulosus* Kalkm. A key is given to the Malesian species.

INTRODUCTION

The first part of this revision of Malesian *Rubus* was published in 1981 (Zandee & Kalkman, *Blumea* 27: 75–113) and treated the subgenera *Chamaebatus* and *Idaeobatus*. A third and last part will cover the subgenus *Lampobatus*.

The subgenus *Malachobatus* contains *R. moluccanus* L., a species with a bad reputation which, however, does not seem to be entirely deserved. In the circumscription chosen it seems to be well recognizable from its nearest relatives. It is a rather variable species which, accordingly, has been divided into a number of varieties – in which I follow Van Royen's treatment of the New Guinean species. A further discussion on delimitation and subdivision is given in the notes under the species. Confirmation or refutation of the idea that *R. moluccanus* is a facultatively apogamous species complex like '*R. fruticosus*' in Europe and North America, will only be possible after experimental and embryological research.

More worrying than *R. moluccanus* may be *R. glomeratus* Bl. for which a polyphyletic origin could be suspected (see p. 380).

In a number of places the attention of readers and users of this paper is directed to a lack of knowledge which could be repaired by more and better-recorded field observations. I hope that future collectors, and especially botanists resident in the Malesian area, will give attention to the problems which cannot be solved in the herbarium.

During the course of this study types and other specimens were seen in or from the herbaria A/GH, B, BM, BO, K, L, NY, P, PNH, SING, U, and W. Directors and curators have been very co-operative in extending loans and giving facilities during my visits to several of the herbaria mentioned. Mr. J. van Os made the drawings, Dr. P. Baas and Mr. B. Kieft the photographs, Dr. R.C. Bakhuizen van den Brink supplied the Latin diagnosis. All this help is gratefully acknowledged.

Subgenus *Malachobatus* (Focke) Focke

Sect. *Malachobatus* Focke, Abh. Naturwiss. Ver. Bremen 4 (1874) 187, see p. 201 for indication of taxonomic level. — Subgen. *Malachobatus* (Focke) Focke, Bibl. Bot. 72 (1910) 41.

Shrubs, climbing or straggling, rarely creeping, very rarely (not in Malesia) small and \pm herbaceous. *Leaves* mostly simple, entire or lobed, sometimes palmately or pedately compound. *Stipules* free, on the twigs near the petiole-base, mostly more or less divided, deciduous or rather persistent. *Inflorescences* terminal, \pm elaborately branched, consisting of axillary racemes or thyrsi. *Flowers* usually bisexual, sometimes the plants (gyno)dioecious. *Fruits* cohering, usually coming loose as one collective fruit together with the dried torus.

Distribution. In the Central and Eastern Himalayan region, South and Central China, Southeast continental Asia and Sri Lanka, few in peninsular India and Japan, throughout Malesia and reaching Australia and island groups in the Western and Southwestern Pacific Ocean. Many species (c. 80?). See also note 5.

Notes. 1. The species of this subgenus in Malesia are erect, climbing or straggling shrubs. Their habit certainly depends for a great deal on the situation at the locality: open, with trees, shrubbery, etc. Some species grow into very large climbers, going up to 10 or more metres high into the trees, the highest record on a label being 30 m (*R. pyrifolius* J.E. Sm.). A sometimes creeping species is *R. rolfei* Vidal (p. 371); *R. elongatus* J.E. Sm. is rarely reported to be creeping.

2. The subgenus is characterized by its free stipules on the twigs and by the usually simple leaves. *R. lineatus* Bl. is the only Malesian species of the subgenus with compound leaves. The flowers are usually bisexual but some species are dioecious. In some other species the situation is not clear.

3. In a fair part of the subgenus the underside of the leaves bears an indumentum of two kinds of hairs: a dense felt of interwoven, thin, curly hairs and between the felt on nerves and veins a number of longer and thicker, \pm straight hairs which may be patent to appressed. The photographs (fig. 2) illustrate this property which in existing descriptions is usually hidden in the intricate and sometimes not unequivocal terminology of indumentum-types.

4. Focke (1910) divided the subgenus into seven sections. One of these, sect. *Moluccani*, was divided again in seven series. This subdivision needs a thorough re-evaluation in which the continental Asian species will play a more important role than the Malesian ones. The subdivision is, consequently, not followed here.

5. Within Malesia New Guinea is strikingly poor in species belonging to this subgenus: only three, including the omnipresent *R. moluccanus*. The New Guinean centre of development shown by subgenus *Idaeobatus* (9 species out of 18 Malesian ones present in New Guinea, 6 of them endemic or sub-endemic), is definitely absent in *Malachobatus*.

6. Several species are regularly found below 1000 m altitude, *R. moluccanus* and *R. alceifolius* even going down to sea-level. The upper limit in the montane region lies generally between 2500 and 3000 m.

1 a. Leaves 5-foliolate 1. *R. lineatus* 2
b. Leaves simple, entire or lobed 2
2 a. Underside of leaves with a closed felt of thin, curly hairs and with straight hairs on nerves and veins 3
b. Thin, curly hairs not present on underside of leaves or, if present, not forming a closed felt (the leaf surface remaining visible) 14
3 a. Stipules and bracts entire or with few minute teeth 4
b. Stipules and bracts distinctly toothed to deeply incised 5
4 a. Inflorescence richly and widely branched. Sepals 5–6 mm long at anthesis
. 3. *R. luzoniensis*
b. Inflorescence a compact 5-flowered raceme (not well-known). Sepals c. 12 mm long 18. *R. perfulvus*
5 a. Dioecious. Often large climbers. Venation transverse 6
b. Flowers bisexual 7
6 a. Leaves distinctly 3-lobed. Flowerbuds ovoid *R. spec.* (2)
b. Leaves ovate, not or very shallowly lobed. Flowerbuds globular 2. *R. elongatus*
7 a. Flowerbuds globular. Stipules and bracts with long, thin, thread-like lobes
. 16. *R. alceifolius*
b. Flowerbuds ovoid, pointed. Lobes of stipules and bracts not thin and thread-like 8
8 a. Inflorescence a simple, compact raceme 17. *R. rolfei*
b. Inflorescence large and branched 9
9 a. Leaves bullate above, the surface distinctly raised between the veins 10
b. Leaves flat above, the nerves (and veins) may be slightly impressed, but leaf surface between the veins not distinctly raised 12
10 a. Outer sepals shortly toothed, teeth up to 1½ mm long. Anthers glabrous. See also *R. spec.* (1) 12. *R. chrysophyllus*
b. Outer sepals with longer lobes or teeth. Anthers hairy on top 11
11 a. Outer sepals on each side with 5 or more lobes, lobes up to 7 mm long
. 13. *R. heterosepalus*
b. Outer sepals with 1–3 teeth on each side, teeth up to 3 mm long
. 19. *R. malvaceus*
12 a. Ovary glabrous 14. *R. moluccanus*
b. Ovary hairy. (See notes under *R. keleiterios*) 13
13 a. Leaves distinctly 3-lobed with cordate base 15. *R. keleiterios*
b. Leaves unlobed, with truncate base *R. spec.* (1)
14 a. Stamens basifixed 15
b. Stamens dorsifixed or dorso-versatile 16
15 a. Underside of leaves with scattered hairs only 4. *R. smithii*
b. Underside of leaves densely hairy 5. *R. beccarii*
16 a. Ovary hairy 17
b. Ovary glabrous 19

- 17 a. Leaves distinctly cordate at base 10. *R. sundaicus*
- b. Leaves with rounded, subtruncate or very shallowly cordate base 18
- 18 a. Leaves less than 1½ times as long as wide, petiole 1½ cm or longer, nerves terminating in the margin. Flowers unisexual (?) 6. *R. cumingii*
- b. Leaves normally more than 1½ times as long as wide, petiole rarely longer than 1 cm, nerves not reaching the margin. Flowers bisexual 7. *R. pyrifolius*
- 19 a. Petals absent or only one 20
- b. Petals 5 22
- 20 a. Flowers large: sepals 10–12 mm long 9. *R. sorsogonensis*
- b. Flowers smaller: sepals 6–8 mm long 21
- 21 a. Leaves 1.0–1.3 times as long as wide. Glandular hairs on twigs, inflorescences and outside of hypanthium and sepals. Outer sepals with 3–6 distinct teeth, up to 1 mm long, on each margin 11. *R. mearnsii*
- b. Leaves 1.4 or more times as long as wide. Glandular hairs sometimes on twigs and inflorescences, not on flowers. Outer sepals entire or with 1 or 2 minute teeth on each of the margins 8. *R. benguetensis*
- 22 a. Stipules and bracts divided into thin, thread-like lobes 16. *R. alceifolius*
- b. Lobes of stipules and bracts not thin and thread-like 23
- 23 a. Stalked glands and prickles present on the outside of hypanthium and sepals
R. spec. (3)
- b. No prickles or stalked glands on the flower (but see note 3 under the species)
20. *R. glomeratus*

1. *Rubus lineatus* Reinwardt ex Blume

- R. lineatus* Reinw. ex Bl., Bijdr. (1827) 1108; Walp., Repert. 2 (1843) 20; Miq., Fl. Ind. Bat. I, 1 (1855) 378; Hook. f., Fl. Brit. India 2 (1878) 333, incl. var. *angustifolius* Hook. f. ('*angustifolia*') and var. *glabrior* Hook. f.; Stapf, Trans. Linn. Soc. Bot. 4 (1894) 145; Focke, Bibl. Bot. 72 (1910) 47, incl. var. *diengensis* Focke, l.c. p. 48; Backer, Schoolfl. Java (1911) 452; Koord., Exk. Fl. Java 2 (1912) 324, f. 65; Focke in Hallier, Meded. Rijks herb. 14 (1912) 39; Koord., Fl. Tjibodas 2 (1923) 105; Backer & Bakh. f., Fl. Java 1 (1964) 514; Hara & Ohashi in Hara, Fl. East. Himal. (1966) 130; Thuan, Fl. Camb., Laos & Vietn. 7 (1968) 76; Steen., Mount. Fl. Java (1972) 45-4. — Lectotype: *Reinwardt s.n.*, holo in L, sheet nr. 905.130-163.
- R. pulcherrimus* Hook., Ic. Plant. 8 (1845) 729, 730; Walp., Repert. 5 (1846) 650; Miq., Fl. Ind. Bat. I, 1 (1855) 378, excl. descr. — Type: *Lobb s.n.* from Java, holo in K, 3 sheets.
- R. lineatus* Reinw. ex Bl. forma *pulcherrimus* Focke in Hallier, Meded. Rijks herb. 14 (1912) 39. — Types: *Elbert 1087, 1681, Gründler 2342* are mentioned.

Shrub, up to c. 3 m high, sometimes more or less climbing and up to 10 m long. *Stems* densely covered with long, appressed hairs, tardily glabrescent, unarmed or with very few, small prickles (up to 3 mm long), rarely more distinctly armed. *Leaves* pedately 5-foliolate, in or near the inflorescence sometimes with fewer leaflets, young leaflets folded lengthwise. *Stipules* early falling, oblong to lanceolate, 2–4 by ½–1 cm, entire, cuspidate, densely sericeous outside, rarely only little hairy, glabrous inside, sometimes recorded as reddish. *Petioles* 2–10 cm long, grooved above; leaflets often sessile or subsessile, more rarely the petiolules up to 2(–5) mm (lateral

leaflets) or 5(–10) mm (terminal leaflet); petiole and petiolules densely, long appressedly hairy, petiole rarely with some small prickles. *Blades* of leaflets oblong to lanceolate, the terminal leaflets 7–18 by 2–7½ cm, the lateral leaflets smaller; base acute, in the lateral leaflets sometimes oblique, margin caudately serrate with 3–6 teeth per cm, apex acuminate to caudate; pergamentaceous; pinninerved with (20–) 30–40(–50) pairs of lateral nerves, terminating in the margin, midrib and lateral nerves impressed above, prominent below, venation transverse, mostly invisible; upper surface long hairy on the midrib, with or without hairs on and/or between the lateral nerves, lower surface always densely sericeous on the midrib and on the lateral nerves, between the nerves either short-woolly and more or less densely long-sericeous or quite glabrous, the indumentum often described as silvery *in vivo*, midrib rarely with some small prickles. *Inflorescences* terminal and in the axils of the upper leaves, up to 5 cm long thyrsi (the terminal ones rarely longer), with up to c. 15 flowers, the bracteate laterals dichasial to monochasial or 1-flowered, in the axillary thyrsi the two lower dichasial laterals usually basal and opposite; *pedicels* up to 2 cm long, densely sericeous as is the rachis; *bracts* and bracteoles stipule-like but smaller. *Hypanthium* flat saucer-shaped, 5–9 mm across, densely sericeous outside, usually glabrous inside except around the torus. *Sepals* ovate-triangular to triangular, 6–13 by 2–7 mm, long-pointed to acuminate, entire, outside densely sericeous, the covered margins sometimes more woolly, inside densely woolly except often in the glabrous lower part. *Petals* falling early, obovate to ± rhomboid, not distinctly clawed, much smaller than the sepals, 4–5 by 2–3½ mm, rounded at apex, glabrous, greenish white to white, sometimes reported as pink. *Stamens* c. 50–c. 150, glabrous; filaments up to 4 mm long; anthers ¾–1 mm long. *Pistils* c. 80 to over 100; ovary c. 1 mm long, with long hairs in the apical part; style up to 5 mm long, long-hairy, usually densely so, at least in the lower part but sometimes almost over the whole length. *Torus* elevated, hairy. *Collective fruit* globose-ovoid, about 1 cm diameter, sepals upright to slightly spreading under the ripe fruit; *fruits* up to 2½ by 2 mm when dry; exocarp orange to red in ripe fruits, juicy *in vivo*, only a thin layer when dry, still hairy; endocarp rugose.

Distribution. Himalayas (Nepal to Arunachal), S. China, Burma, N. Vietnam, Sumatra, Java, Lesser Sunda Islands, Borneo. According to Focke (1910) also in 'Malacca' (Peninsular Malaysia) and according to Van Steenis (1972) also in S. Celebes; from neither region any specimen seen.

Habitat. Lighter places in different types of forest, and on other not too dark places like streambanks, landslides, shrubberies and roadsides, at altitudes from c. 1400 to c. 3000 m, rarely higher, up to 3800 m.

Vernacular names (as reported on herbarium labels). Pingat (W. Sumatra); kimèrang (Java, Sundanese); kala kutjet (Java, Javanese).

SUMATRA. *Aceh.* Mt Leuser and vicinity, several specimens. — *North.* Mt Sinabung, Djadoek 961, Lörzing 8155; Mt Pinto, Lörzing 8243; Mt Sibayak, Bartlett 6517, Docters van Leeuwen 12848, Lörzing 7322, 13512, Yates 1506; Berastagi, Symington CF 25086; Lake Toba, Bangham 1238, Lörzing 16290, Hamel & Rahmat si Toroes 611; Sidikalang, Alston 15032. — *West.* Mt Talakmau, Bünnemeijer 812, 855, Jacobson s.n.; Mt Singgalang, Beccari 135, Bünn-

meijer 2676, Meijer 3871, Yates 2424; Mt Merapi, several specimens; Mt Talang, Bünnemeijer 5523; Mt Kerinci, many specimens. — South. Mt Dempo, Forbes 2446. — Lampung Prov. Mt Pesagi, van Steenis 3686; Mt Tanggamus, Jacobs 8241, Toxopeus 5.

JAVA. West. Mt Salak, Koorders 36734; Mts Gede–Pangrango, many specimens; Mt Tangkubanperahu, several specimens; Mt Burangrang, Bakhuizen van den Brink 4587; Mt Patuha, several specimens; Mt Kendeng (between Mts Patuha and Tilu), Scheffer s.n.; Mt Kendeng (near Bandung), Docters van Leeuwen s.n., Smith & Rant 412; Mt Malabar, den Berger 760, Forbes 963, van Slooten 298; Mt Papandayan, several specimens; Mt Guntur, Burck 451, Kerkhoven 12, Kostermans 94; Mt Ciremay, Backer 5084, Docters van Leeuwen 2522; Kandangbadak, Yates 2839. — Central. Mt Slamet, Backer 508, de Monchy s.n.; Dieng Mts, several specimens; Mt Rogojembangan, Backer 16130; Mt Perahu, Backer 21821, Brinkman 160, Horsfield s.n., Lörzing 301; Mt Sundoro, Docters van Leeuwen 8941; Mt Sumbing, Docters van Leeuwen 8839; Mt Ungaran, Docters van Leeuwen 2094; Mt Merbabu, several specimens; Mt Merapi, Coert 124, 128, Junghuhn s.n.; Mt Lawu, Docters van Leeuwen 8213, Elbert 239, Waitz s.n., Yoshida 1823. — East. Mt Kawi, Docters van Leeuwen 12349; Mt Arjuna, Koorders 43776, Skottsberg & Backer s.n., Wurth s.n.; Mt Welirang, van Steenis 7035; Tengger Mts, several specimens; Mt Mahameru, Backer 3751; Semeru Mts, Mt Widodaren, Backer 3703; Iyang Mts, several specimens; Ijen Mts, Kostermans s.n., unknown coll. 1688.

LESSER SUNDA ISLANDS. Bali. Sarip 405, van Steenis 7851. — Lombok. Elbert 1087, 1681, 2167, Gründler 2342. — Sumbawa. Gründler 4065. — Flores. Schmutz 3254, Veldkamp 7038, Verheijen 3001, 3398. — Timor. Schmutz 2331, van Steenis 18422.

BORNEO. Sabah. Mt Kinabalu, many specimens; Kundasan, Poore H 406.

Notes. 1. Variability in this species can in the first place be observed in the indumentum of the leaves. As expressed in the description, the space between the nerves on the lower surface of the leaflets is either quite glabrous or it is hairy and in the latter case almost always very densely so. For the latter kind of plants a forma *pulcherrimus* Focke (non *R. pulcherrimus* Hook.) could be distinguished. The typical form to which the types of *R. lineatus* Bl. and *R. pulcherrimus* Hook. belong, has the lower leaf surface glabrous between the nerves. The two forms do not show other consistent differences in morphology and they occupy the same area (except perhaps in Borneo, see note 3), the same altitudinal range and the same habitats. I saw only very few intermediates (sparsely hairy between the nerves) and only one sheet (*Docters van Leeuwen-Reynvaan* 213 from Java) where both kinds of leaves are present on the same twig. Miquel recognized the presence of the two kinds in Java but applied the name *R. pulcherrimus* incorrectly to the hairy kind. The type of *R. pulcherrimus* in K has three twigs with altogether 8 attached leaves, all glabrous between the nerves, only one unattached leaf being hairy all over.

2. Variable are also the dimensions of the flowers. Focke made a var. *diagensis* for the larger-flowered forms but there is no break in the variation. Also var. *angustifolius* Hook. f. for plants with narrow leaflets is not of taxonomic value.

3. The Bornean specimens seen have leaflets hairy between the nerves on the lower surface (see note 1), except *J.M.B. Smith* 546. The leaves of this specimen are deviating in being all trifoliolate and having short petioles and few nerves. It does not seem unlikely that introgression from *R. lowii* Stapf is responsible for these deviations.

4. In BO there are a few specimens collected in Java, which might be hybrids of *R. lineatus* with other species. *Hallier* 570 and *Lörzing* 2418 from Mt Gede are not

densely hairy on the leaflets below, the other parent may be *R. alpestris* although this belongs to a different subgenus (see Zandee & Kalkman, *Blumea* 27, 1981, 104). The leaflets in the other putative hybrids (*van Steenis* 4286 from Mt Papandayan and *Jeswiet s.n.* from Tengger Mts) are clothed with a dense felt below. Field observations are needed.

5. The fruits of this species are usually reported to be rather acid or tasteless.

6. The description given only refers to the Malaysian specimens, not to the continental ones.

2. *Rubus elongatus* J.E. Smith

- R. elongatus* J.E. Sm., Pl. Icon. Hact. Ined. 3 (1791) t. 62; Willd., Sp. Pl. 2 (1799) 1087; Poir. in Lam., Enc. Méth. 6 (1806) 248; Seringe in DC., Prod. 2 (1825) 567; Bl., Bijdr. 17 (1827) 1112; Miq., Fl. Ind. Bat. I, 1 (1855) 380; Koord., Meded. Lands Plantent. 19 (1898) 449; Focke, Bibl. Bot. 72 (1910) 60, f. 22; Backer, Schoofl. Java (1911) 456; Koord., Exk. Fl. Java 2 (1912) 322; Hallier, Beih. Bot. Centralbl. 34, 2 (1916) 21; Merr., Enum. Born. Pl. (1921) 288; Ridl., Fl. Mal. Penins. 1 (1922) 679; Merr., Contr. Arn. Arbor. 8 (1934) 69; Hochr., Candollea 6 (1936) 460, incl. var. *genuinus* Hochr.; Backer & Bakh. f., Fl. Java 1 (1964) 516. — Type: a Commerson specimen from Java, holo in herb. Smith, LINN, IDC microfiche nr. 902.90.
- R. lobbianus* Hook., Icon. Pl. 8 (1848) pl. 741/742; Kuntze, Meth. Speciesbeschr. (1879) 61. — *R. moluccanus* L. var. *lobbianus* (Hook.) Kuntze, Rev. Gen. Pl. 1 (1891) 222. — Type: *Lobb* 62, holo in K, iso seen in BM.
- R. elongatus* J.E. Sm. var. β *subsiniuosa* Miq., Fl. Ind. Bat. I, 1 (1855) 381. — Type: *Junghuhn s.n.*, holo in L, sheet nr. 905.130–95.
- R. elongatus* J.E. Sm. var. γ *extensiflora* Miq., l.c. — Type: *Junghuhn s.n.*, holo in L, sheet nr. 905.130–94.
- R. blumei* Focke, Bibl. Bot. 72 (1910) 60. — Type: *Korthals s.n.*, holo in L, sheet nr. 905.130–80/81.
- R. elongatus* J.E. Sm. var. *forbesii* Focke, l.c. — Type: *Forbes* 1614, holo in L, iso seen in BM.
- R. elongatus* J.E. Sm. var. *tidorensis* Focke, l.c. — Type: *Reinwardt s.n.*, holo in L, sheet nr. 905.130–89 (one of the twigs on the sheet).
- R. magnibracteatus* Ridl., J. Fed. Malay St. Mus. 8 (1917) 32. — Type: *Robinson & Kloss s.n.* from Sumatra, holo in SING, iso seen from BM, K.
- R. elongatus* J.E. Sm. var. *laeicalyx* Ridl., l.c. 31. — Type: *Robinson & Kloss* 143 from Sumatra, holo probably in SING, iso seen from BM.

Climbing or scrambling, rarely creeping plant, often reported as very large, up to 25 m long, dioecious. Woody stems thick, dark brown to black, glabrous but still with rudiments of prickles; leafy twigs densely villous to almost glabrous, with few to many, short (c. 1 mm), straight, downwards directed prickles. Leaves simple. *Stipules* usually early falling, pinnatipartite with 5–9 narrow, pointed lobes on each side of the \pm ovate 'body', the whole structure suborbicular to elliptic in outline, 6–9 by 6–10 mm, the lobes up to 4 mm long, (rather) densely appressed-hairy outside, almost glabrous inside. *Petioles* 2½–5½ cm, densely villous to almost glabrous, prickles few to rather many, 1–2 mm long, directed downwards, straight to slightly curved. *Leaf-blades* ovate, only very shallowly lobed or not at all, length/width 1.4–2, 7½–15 by 5–9½ cm; base cordate (up to 2½ cm deep, the incision sharp to obtuse, the lobes

rounded) to truncate in the smaller leaves and sometimes in the leaves of the inflorescences, margin rather regularly serrate to dentate, sometimes very shallowly so, with 5–8 teeth per cm, apex acute; rather firmly herbaceous; nervation pedate, with 3 main side nerves on each side and at the entire base of the midrib, each with c. 3 basiscopic lateral nerves, on the midrib 5–7 pairs of lateral nerves, nerves terminating in the margin, venation transverse, nerves and veins flat to slightly impressed above, prominent below; upper surface densely semi-appressed hairy on nerves and veins to almost glabrous, lower surface with a short dense mat of strongly curled hairs and with longer semi-appressed hairs mainly on nerves and veins, prickles only on midrib below or also some on the main nerves; leaves *in vivo* darkgreen above, whitish (also reported as greyish or bluish) below, in herbarium (dark) brown above, lighter yellow-brown below. *Inflorescences* terminal, compound racemes, the lower branches in the axils of leaves, the upper ones bracteate (transitions leaf-bract sometimes present), the main axis terminating in a raceme, the entire inflorescence 12–35 cm long; primary side branches 6–18, sometimes simple but the lower ones on the well-developed inflorescences usually branched again up to the 3rd order; the lower laterals 2–10 cm long, the longest one usually the second from below, shorter towards the apex and less branched; the laterals with up to c. 25 flowers in the richly-branched ones, usually fewer; the axes of the inflorescence densely villous or woolly to sparsely hairy, with prickles on main axis and side branches; *pedicels* up to 3 mm long, densely villous to slightly hairy; *bracts* of laterals and flowers usually early falling, lobed like the stipules or with the lobes only on the apical part, more or less boat-shaped, 6–8 (–12) by 3–6 mm, appressed-hairy and with minute glands outside, glabrous inside; bracteoles 2, halfway on pedicel, like the bracts but smaller and with the lobes \pm restricted to the apex, $1\frac{1}{2}$ –3 by c. 2 mm. *Flowers* functionally unisexual with rudiments of the other sex; flowerbuds globular. *Hypanthium* cup-shaped, becoming flatter (to saucer-shaped) with age, $3\frac{1}{2}$ –5 mm across, 1– $1\frac{1}{2}$ mm high, on outside with appressed hairs above a short dense felt of curly hairs (tomentellous), inside with long hairs around the torus. *Sepals* rounded triangular to (broadly) ovate, 3–6 by $2\frac{1}{4}$ – $3\frac{1}{2}$ mm, growing slightly after anthesis, apex rounded with under the top on the back side a small apiculus, or acute, margins entire, red to purple *in vivo* (also hypanthium, pedicels and bracts), indumentum outside as on hypanthium, inside tomentellous. *Petals* \pm obcordate to obovate, 5–11 by 4–6 mm, apex rounded to undulate or distinctly emarginate, base gradually narrowing, claw usually not distinct, white (sometimes reported as pink), glabrous. *Stamens* 80–125, glabrous; filaments 2– $2\frac{1}{2}$ mm long; anthers $\frac{3}{4}$ – $1\frac{1}{4}$ mm long, longer than wide, basifixed; staminodes in \varnothing flowers 60–90, minute, $\frac{1}{2}$ –1 (– $1\frac{1}{2}$) mm long, with reduced anthers. *Pistils* 45–70, glabrous; ovary c. 1 mm long; style c. 2 mm long; stigma bifid; pistillodes in σ flowers c. 1 mm including the style. *Torus* elevated (except sometimes in σ flowers), long-hairy. *Collective fruit* globose, 6–10 mm diameter (when dry), sepals closing after anthesis, spreading under the ripe fruit; *fruits* \pm sickle-shaped, 2– $3\frac{1}{2}$ by 1–2 mm; exocarp red turning purple and finally black, a rather thin layer when dry; endocarp distinctly rugose especially on and near the broad dorsal side of the pyrene.

Distribution. Sumatra, Malaya, Java (Western part), Borneo, Celebes (Northern part), Moluccas (only Tidore). See notes 3 and 5.

Habitat. In forest, thickets, near rivers and roads, at altitudes between 300 and 2300 m. See note 4.

Vernacular names (as reported on herbarium labels). Rinu-rinu, tumbur harangan (N. Sumatra), kaju aro (W. Sumatra); lintagu and variants (Sabah, Elopura), langamit (Sabah, Kadayan), dila palian (Sabah, Murut).

SUMATRA. Aceh. Mt Ketambe, de Wilde c.s. 14181, 14289. — North. Bandarbaru, Lörzing 4743, 4744; several localities around Lake Toba, several collections; Tapanuli, Alston 14991, Kerling s.n. — West. Mt Ophir (Talakmau), Bünnemeijer 678, 770, 887, 1179; Mt Kerinci, Bünnemeijer 8624, 8700, 10247 (hybrid?), Jacobs 4355, 4556, 4560, Meijer 7420; Sandaran Agong, Robinson & Kloss s.n.; Sungei Kumbang, Robinson & Kloss 143. — South. Bengkulu, Ajoeb 268, de Voogd 111; Muaradua, de Voogd 327; Lampung, Forbes 1614, Jacobs 8304, Zollinger 758.

MALAYA. Perak. Larut, King's collector 3465, 5132; Waterfall Hill, Wray 1849; Maxwell's Hill, Sinclair & Kiah SF 38814. — Selangor. Ulu Gombak, Burkill & Haniff 16390, Phytochem. Survey 2795, 2928, Stone 12642; Ginting Simpak, Hume 8534, 8660, Strugnell 12881. — Johore. Kluang, Kochummen Kep FRI 2191. — Penang. Gaudichaud 107.

JAVA. West. Mt Karang, Koorders 40662; Mt Halimun, van Balgooy 2920; localities near Bogor, several specimens; localities on Mts Gede-Pangrango, several specimens; Mt Tankubanperahu, Anderson 28, Kuntze 5341; Lembang, Korthals s.n.; Mt Tilu, Coert 630; localities near Bandung, Backer 25916, Junghuhn s.n., Kostermans 204, Lörzing 1182; Mt Malabar, Koorders 42165, van der Pijl 270; Mt Telagabodas, Hochreutiner 2159. — Central. Mt Telomojo, Koorders 27904.

BORNEO. Sarawak. Tau Range, Bukit Bersing, Purseglove 5228. — Sabah. Mt Kinabalu, Chew c.s. 1672; Sandakan, different localities, several specimens; Sapagaya, Puasa 1371. — Indonesian Borneo. East. West Kutai, Ender 3494; Mt Njapa, Kato & Wiriadinata B5879.

CELEBES. North. Minahasa, Koorders 18563; Gurupahi, Kaudern 26.

MOLUCCAS. Tidore. Peak, Reinwardt s.n. (mixed collection, locality correct?; see note 5).

Notes. 1. Almost 80% of the herbarium collections of this species is female. Probably this only reflects the inclination of collectors to pick twigs with flowers and fruits, when these are present in a population. Collectors are urged to make field observations on the sex ratio. Backer (1911) was the first author noting the unisexuality of the flowers.

2. Generally the twigs, petioles and inflorescences are rather glabrous in Malaya and Borneo, up to densely hairy in Java and Sumatra. It is not quite consistent and the difference cannot be used for infraspecific delimitation.

3. The species was reported for Laos and Vietnam by Thuan, Fl. Camb., Laos & Vietn. 7 (1968) 38, and for Thailand by the same author in Fl. Thailand 2 (1970) 53. I saw several of the specimens cited by Thuan, in my opinion they are certainly not conspecific with the Malesian material.

4. Information about the altitudinal distribution is unbalanced. For Java and Sumatra there are sufficient data, there the species occurs from (c. 500–)1000–2000 (–2300) m. For Malaya, Borneo and Celebes the few data available (6, 10, 2, respec-

tively) seem to indicate that there the species occurs mainly at altitudes below 600 m.

5. The distribution in Eastern Malesia is obviously very incompletely known. Occurrence in the Moluccas is far from certain, the only specimen consisting of two species and one original label!

3. *Rubus luzoniensis* Merrill

R. luzoniensis Merr., Philip. J. Sc., Suppl. 1 (1906) 195; Elmer, Leaf. Philip. Bot. 2 (1908) 452; Focke, Bibl. Bot. 72 (1910) 59; Merr., Enum. Philip. Flow. Pl. 2 (1923) 228. — Type: Merrill 4596, holo lost, iso seen from BO, K, L.

Climbing or sprawling vine, up to 10 m long, gynodioecious? (see note 1). Woody stems brown, glabrous, still with prickles; leafy twigs densely covered with long, patent, soft hairs, hiding a layer of scattered, short, curly hairs, prickles rather few to many, short (1 mm) but strong, straight, directed downwards. Leaves simple. *Stipules* often rather persistent, linear, curved, 12–19 by 3–4 mm, apex blunt, margins entire or with few minute teeth, hairy outside, glabrous inside. *Petioles* 1–3 cm long, densely hairy and with some prickles as the twigs. *Leafblades* (broadly) ovate to suborbicular, length/width 1.2–1.5, 5–8½ by 4–6½ cm, very shallowly and often irregularly lobed or not at all; base shallowly cordate (up to ½ cm deep, with incision obtuse and lobes rounded) or truncate, margin serrate with 8–10 teeth per cm, apex obtuse to acute; stiff-coriaceous; nervation pedate, with 2–3 main side nerves on each side at the base of the midrib, each with 2–4 basiscopic lateral nerves, on the midrib 3–4 pairs of lateral nerves, nerves ending in the marginal teeth, venation transverse, nerves and veins flat to slightly impressed above, prominent below; upper surface densely semi-appressedly hairy on nerves and veins and less densely and more appressedly so in between, lower surface with a dense cover of short woolly hairs all over and with longer, appressed to semi-appressed, straight hairs on nerves and veins, some prickles on the stronger nerves below; leaves olive green above and golden-brown below *in vivo*, darkbrown above and yellowish brown below in herbarium. *Inflorescences* terminal, richly and widely branched and many-flowered, panicle-like compound racemes with the lower side branches in axils of leaves, upper ones bracteate, the entire inflorescence up to 40 cm long; primary side branches up to 15, in well-developed inflorescences branched up till the third or fourth order, up to 18 cm long, all branches ending in a flower; branches of the inflorescence densely hairy as the twigs and also with prickles; *pedicels* up to 5 mm long, hairy; *bracts* rather large and persistent, elliptic, those under branches up to 12 by 5 mm, the flower-bearing ones up to 6 by 4 mm, entire, shortly woolly and with straight semi-appressed hairs outside, glabrous inside; bracteoles at base of pedicels, like the bracts but smaller (c. 4 by 2 mm) and more elliptic-ovate. *Flowers* functionally female or bisexual (see note 1). *Hypanthium* saucer-shaped, 3–4½ mm across, c. 1 mm high, densely appressed-hairy outside, inside glabrous except a ring of long hairs around the torus. *Sepals* ovate, 5–6 by 2½–4 mm, the outer ones broader than the inner ones, growing after anthesis to

8 by 6 mm, apex apiculate, margins entire or the not-covered ones with one or few minute teeth (shorter than 1 mm), on the outside the margins which were covered in bud densely woolly, the other parts with long appressed hairs over the woolly felt, inside short-woolly. *Petals* obovate to elliptic, 5–6½ by 2½–4 mm, apex obtuse to emarginate, margins more or less undulating, base tapering, not clawed, white, with some hairs on the outside. *Stamens* 50–100, glabrous; filaments up to 4½ mm; anthers ½ mm long, dorsifixed; staminodes in female flowers with shorter filament (–2½ mm) and minute anthers (¼ mm or shorter). *Pistils* 15–25; ovary c. 1 mm long, long-hairy at the top on the backside; style 2–3 mm, with some hairs at the base; stigma 2-lobed. *Torus* slightly elevated, long-hairy. Only few *fruits* developing per flower (few seen), sepals closing around the fruits after anthesis. *Fruits* c. 3 by 2 mm; exocarp bright red, rather a thick and tough layer when dry, still hairy near the apex; exocarp rugose.

Distribution. Philippines (Luzon).

Habitat. Forest and clearings in forest, at altitudes from c. 2000 to c. 2500 m.

PHILIPPINES. L u z o n. Mt Pulog, Jacobs 7124, 7370; Mt Data, Merrill 4596, Ramos & Edaña BS 40186; Mt Polis, Celestinó PNH 7986.

Notes. 1. From the five specimens seen four are functionally female, having distinctly reduced and not-polliniferous anthers in the flowers. The other specimen (the type) looks bisexual rather than male. The only indication that the pistils might be non-functional is that in these flowers the styles are shorter (2 mm) than in the female flowers (3 mm). Observations in the field are necessary.

2. The species is apparently most closely related to *R. elongatus* J.E. Smith which is missing in the Philippines. It differs most conspicuously from said species in the shape of stipules and bracts, both deeply lobed in *R. elongatus*.

3. About the relation to the incompletely known *R. cumingii* Kuntze, see there, p. 333.

4. *Rubus smithii* Backer

R. smithii Backer, Schoolfl. Java (1911) 456. — *R. sundaicus* auctt. non Bl.: Focke, Bibl. Bot. 72 (1910) 56, p.p.; Koord., Exk. Fl. Java 2 (1912) 322; Fl. Tjibodas 2 (1923) 105; Backer, Brittonia 3 (1938) 80; Backer & Bakh. f., Fl. Java 1 (1964) 516, p.p. — Type: not indicated. In BO and L there are some specimens, identified by Backer as *R. smithii* before 1911. Backer 33873 (BO) is here nominated as lectotype.

R. maximus Kuntze, Meth. Speciesbeschr. (1879) 62, 76, nom. illeg., non *R. maximus* Marsson, Fl. Neu-Vorpomm. (1869) 151. — *R. moluccanus* L. var. *maximus* Kuntze, Rev. Gen. Pl. (1891) 222. — Type: Kuntze mentioned finds on Mt Malabar, Mt Pangrango and Mt Salak on Java. I saw the following specimens from NY: Kuntze 5423 and s.n. from Malabar, 4613 from Pangrango (also in A), and 4856 from Salak. Backer (1938) mentioned also Kuntze 5429, not seen by me.

Climbing shrub, reported up to 10 m long, dioecious (or gynodioecious? see note 3). Twigs brown, patently hairy, densely so when young, sometimes also with short

curly hairs, prickles few to many, 1–2 mm long, straight to curved, reddish *in vivo*. Leaves simple. *Stipules* rather persistent, deeply incised, pinnatisect to pinnatipartite, with 3–5 lobes on each side, 5–9 by 3–5 mm, the lobes 2–5 by $\frac{1}{4}$ – $\frac{1}{2}$ mm, densely long-hairy outside, glabrous to hairy inside. *Petiole* 1–4 cm long, longer on sterile branches, patently hairy, densely so when young, with some to many prickles. *Leaf-blades* ovate in outline, only shallowly lobed or not at all, length/width 1.5–1.8, 7–15 by $4\frac{1}{2}$ –9 cm, base subtruncate to cordate, basal incision up to 2 cm deep, rarely (Sumatra) deeper in large leaves, sometimes (especially in or near inflorescence) truncate, margin grossly serrate with 4–6 teeth per cm, apex acute to subacuminate (sometimes obtuse); rather stiffly herbaceous; nervation pedate with 2(–3) main side nerves on each side and at the base of the midrib, each with 3–5 basicopic lateral nerves, on the midrib 4–8 pairs of lateral nerves, nerves terminating in the margin, venation widely transverse, nerves slightly impressed above, distinctly prominent below, veins \pm flat above, rather distinct below; upper surface with patent hairs only on the main nerves, lower surface with scattered semi-appressed to patent hairs on nerves and veins, few prickles on midrib below; upper surface olive green to brownish when dry, lower surface light to middle brown, according to scarce notes green on both sides *in vivo*. *Inflorescences* terminal, pendent to overhanging, compound racemes, the lower lateral racemes in the axils of leaves, the upper ones bracteate (transitions leaf-bract sometimes present), the entire inflorescence 15–35 cm long; primary side branches up to 12(–15), the lowermost ones up to 9 cm long, shorter towards apex, bearing up to 7 lateral dichasia or cymes, the dichasia sessile or shortly stalked, with up to 5 flowers, towards apex of inflorescence or lateral less elaborate and becoming 3- to 2-flowered cymes, ultimately single flowers; axes of inflorescence densely woolly and with patent to semi-appressed longer hairs, with scattered prickles; *pedicels* 6–10 mm long, densely woolly; *bracts* of laterals stipule-like; bracts of cymes and flowers dentate at apex, 4–6 by up to 1 mm, with 3–5 teeth of 1–3 mm long, densely long-hairy; bracteoles at the base of the pedicel, up to 2 by 1 mm, dentate at apex, densely hairy. *Flowers* functionally unisexual with remnants of the other sex; flowerbuds broadly ovoid. *Hypanthium* cup-shaped, 4–5 mm across, 1 mm high, densely woolly outside and with overlying appressed hairs, long-hairy inside. *Sepals* (broadly) ovate, $3\frac{1}{2}$ –5 by 3–5 mm, with small apiculus on backside just under the obtuse apex, margins entire, outside hairy as the hypanthium, inside woolly, sometimes reported as purplish, after anthesis slightly enlarging and up to $6\frac{1}{2}$ mm long. *Petals* obovate, 7–9 by 5–6 mm, with rounded or emarginate apex, undulate margin, not clawed, glabrous, white. *Stamens* 70–140, glabrous; filaments up to 3 mm long; anthers $1\frac{1}{2}$ –2 by $\frac{1}{2}$ – $\frac{3}{4}$ mm, basifixed; staminodes in \varnothing flowers 60–100, up to $1\frac{1}{2}$ mm long, including the minute anther-rudiment, glabrous. *Pistils* 30–100; ovary c. 1 mm long, densely long-hairy on the back (Java) to glabrous (Sumatra); style 1–3 mm, glabrous; stigma slightly broadened, truncate; pistillodes in σ flowers as pistils but smaller (? , see note 3). *Torus* (slightly) elevated, densely long-hairy. *Collective fruit* globose, up to 1 cm diameter when dry, compact, sepals spreading under the ripe fruits; *fruits* slightly curved, up to 3 by 2 mm, with broad dorsal side, still densely hairy; exocarp rather thick-fleshy or juicy, light red (to blackish?); stone $2\frac{1}{2}$ by $1\frac{1}{2}$ mm, endocarp rugose.

Distribution. Sumatra, West Java.

Habitat. Forest and forest-edges, from c. 300 up to 2050 m altitude.

Vernacular names (as reported on herbarium labels). Pingat (W. Sumatra); hareu-eus (Java, Sundanese).

SUMATRA. Aceh. Ketambe, de Wilde c.s. 12193, 19251; Mt Guhra, Alston 14626, de Wilde c.s. 12827; Boer ni Bias (near Lake Luttawar), van Steenis 6189. — North. Sibolangit, Lörzing 8502. — West. Mt Kerinci, Alston 14100, Bünnemeijer 9127.

JAVA. West. Mt Salak, Kuntze 4856, de Voogd s.n.; Mt Pangrango, Kuntze 4613; Mt Gede, different localities, Backer 33873, Hallier 511, Koorders 26786, 31653, 42674, Smith & Rant 520a, van Steenis 2117; Mt Patuha, Backer 12466; Pengalengan, Backer 26144, Docters van Leeuwen 2348; Mt Malabar, Backer 5759, Kuntze 5423, s.n., van Slooten 773, Smith s.n.; Mt Wayang, Scheffer 55; Mt Papandayan, Scheffer 54; Mt Jaya, van Steenis 4889; Mt Mandalagiri, Lam 74 J; Telagabodas, Boerlage s.n., Burck 131.

Notes. 1. The specimens from Java are very homogeneous. They differ from the related *R. elongatus* J.E. Smith in having distinctly hairy ovaries which retain the hairs until the fruiting stage. The Sumatra specimens are slightly different from the Java material. The most obvious difference is found in the ovaries being glabrous to only slightly hairy. Also some other flower details (measurements, numbers) appear to differ but the amount of material is too small to evaluate the differences taxonomically. The difference between *R. elongatus* and *R. smithii* in the indumentum on the leaf underside remains intact in all cases, in Java as well as in Sumatra (*elongatus* has a closed felt of curly hairs and also straight hairs, *smithii* has only the latter type).

2. The name *R. sundaicus* Blume, which has sometimes (e.g. by Focke) been applied to specimens belonging to the present taxon, can only be typified by two sheets in L (905.290-89/90). These specimens most certainly do not belong to *R. smithii*: they have different sepals, different stamens and bisexual flowers. Focke also saw one or more specimens of *R. smithii*, according to his identifications on the labels, but he apparently did not recognize the differences.

Backer (1911) separated the *sundaicus*-type from the remainder of the material, describing the latter as *R. smithii*. Later (1938) he came back from this correct view in saying that the Kuntze specimens of *R. maximus* Kuntze were 'vigorous young shoots of *R. sundaicus* Bl.'. See p. 340 for *R. sundaicus*.

3. Almost all specimens with well-developed flowers appeared to be female with strongly reduced and obviously non-functional stamens. Only 3 specimens were seen with perfect stamens in the flowers. From this material it cannot be fully ascertained that in these flowers the pistils are non-functional as they are not always distinctly smaller.

4. Closely related, if not conspecific, is *R. beccarii* Focke (see below).

5. *Rubus beccarii* Focke

R. beccarii Focke, Bibl. Bot. 72 (1910) 62. — Type: *Beccari* 175 from W. Sumatra, Mt Singgalang, holo in L, no iso seen.

Seemingly a large climber, dioecious?. *Twigs* stout, densely hairy with short, curly hairs and longer, straight (semi-)patent hairs, with rather many, short (1 mm) prickles. *Leaves* simple. *Stipules* (few seen) c. 1 cm long, deeply divided into some thin lobes. *Petioles* c. 2 cm, densely hairy as the twigs. *Leafblades* ovate, not lobed, length/width 1.3–1.6, 9–11½ by 6½–7½ cm, base shallowly cordate, basal incision up to ¼ cm deep, margin serrate, apex acute to shortly acuminate; rather thick and firm; nervation pinnate, the lowermost pair of lateral nerves with c. 5 basiscopic side nerves, sometimes the lowermost of these also basiscopically branched and the nervation more distinctly pedate, 7–8 pairs of lateral nerves on the midrib, lateral nerves not always terminating in the margin but sometimes dissolving in smaller veins near the margin, the latter going into the teeth, venation transverse, nerves and veins impressed above, prominent below; upper surface long patently hairy, denser on nerves and veins, lower surface with a dense cover of long, straight, patent hairs, on midrib and nerves also with few, short, curly hairs, leaf surface visible between the hairs; leaves *in sicco* dark brown above, lighter brown below. *Inflorescence* only fragmentarily seen, axes densely hairy. *Flowers* possibly functionally unisexual, only males seen, buds globular. *Hypanthium* c. 5 mm across, densely hairy outside with a short woolly felt and long straight hairs. *Sepals* broadly ovate, the outer ones 6 by 6 mm, inner ones c. 4½ by 5 mm, uncovered margins with c. 5 small teeth on each side, covered margins entire, outside hairy as hypanthium. *Petals* (not full-grown) 7 by 6 mm, tapering at base, rounded at apex, glabrous. *Stamens* c. 115, glabrous; anthers longer than wide, 1 mm long, basifixed. *Pistils* many, not developed, ovary c. 1 mm, gradually narrowing into the c. 2½ mm long style, back of ovary and basal part of style long-hairy. Fruits not seen.

Note. I know this species from only one sheet. It looks a distinctive species, most closely allied to *R. smithii* Backer with which it has much in common. The main difference lies in the indumentum of the leaf underside: densely hairy in the present species, only scattered hairs in *R. smithii*. Future collections may well obliterate this difference.

6. *Rubus cumingii* Kuntze

R. cumingii Kuntze, Meth. Speciesbeschr. (1879) 72, 76; Focke, Bibl. Bot. 72 (1910) 58, f. 21; Merr., Enum. Philip. Flow. Pl. 2 (1923) 227. – Type: *Cuming s.n.* from the Philippines, according to Focke from Luzon, but this is not on the label. Holo in B, maybe this is the only sheet in existence, the photograph in Focke (1910) was made from this specimen.

? Shrub. *Twigs* with some remnants of thin curly hairs and with rather many appressed to patent, long and thicker hairs, prickles rather many, short, 1 mm long, straight. *Leaves* simple. *Stipules* entire and elliptic? (only remnant seen). *Petioles* c. 1½ cm, densely covered with patent hairs and with some prickles. *Leafblades* ovate, not lobed, length/width c. 1.3, 7–8 by 5–6 cm; base subtruncate, the basal incision wide and only few mm deep, margin serrate with c. 6 teeth per cm, apex acute; herbaceous; nervation pedate with 2 main side nerves on each side at the base of the

midrib, each with 4 basiscopic lateral nerves, on the midrib 5 pairs of lateral nerves, nerves terminating in the margin, venation transverse, nerves and veins flat to slightly impressed above, prominent below; both surfaces with long (semi-)appressed hairs on the nerves and fewer on and between the veins; leaves midbrown when dry, above slightly darker but leaves not distinctly two-coloured. *Inflorescence* terminal, panicle-shaped, c. 15 cm long and wide with 4 primary side branches, rich-flowered; axes densely patently hairy; *pedicels* c. 3 mm (few mature flowers seen); *bracts* persistent, ovate, up to 6 by 3 mm, appressed-hairy outside, glabrous inside. *Flowers* functionally unisexual, buds ovoid. *Hypanthium* cupular, c. 5½ mm across, densely appressed-hairy outside, these hairs completely hiding the underlying short curly hairs, inside glabrous except around the torus. *Sepals* broadly ovate, pointed, outer ones 5 by 4 mm, with one short tooth on each of the not-covered margins, inner ones narrower, c. 3 mm, entire, outside with indumentum as hypanthium, inside tomentellous. *Petals* persistent, elliptic, with a less than ½ mm long claw, 3½ by 2 mm. *Staminodes* in ♀ flower c. 60, glabrous; filaments c. 2 mm, thin; anther rudiments minute. *Pistils* 14; ovary long-hairy on the back near the apex; style c. 2½ mm, also hairy at base. *Torus* little elevated, hairy. *Fruits* c. 2½ by 1 mm.

Notes. 1. The description given above was made only after the type specimen. In most respects this specimen agrees with *R. luzoniensis* Merr. (see p. 328). It has female flowers in a rich, panicate inflorescence with entire, persistent bracts. The staminodes have a minute anther rudiment, ovaries are few and hairy. However, on the lower leaf surface the indumentum consists only of straight hairs on nerves and veins and there is no sign of the closed woolly felt of *luzoniensis*.

Another specimen, *Steiner 2027* from Luzon (seen from L), may be the same species. Curly hairs are present here (but one has to search for them) between the straight hairs on the nerves, the intervenium is glabrous and the felt is absent. This collection has flowers with functional stamens and with ovaries which look normal, although with short styles. Fruits or developing ovaries are not present on the specimen. This same situation is also found in the type of *R. luzoniensis*, see note 1 to that species, p. 329.

A specimen from Ternate in the Moluccas (*Beguin 1546*, seen from BO and L) has the same kind of leaves: broadly ovate with ± truncate base, unlobed and with pedate nervation. The indumentum on the lower surface is cobwebby, thicker straight hairs are only present on the midrib. Stipules and bracts are incised and there are also some deviations in the flowers, which may be male or bisexual.

I consider it too early to reduce *luzoniensis* to *cumingii*. More material and more field observations in the Philippines are needed. See also under *R. edanoi* Merr. (p. 383) and *R. sundaicus* Bl. (p. 340).

7. *Rubus pyrifolius* J.E. Smith

R. pyrifolius J.E. Sm., Pl. Icon. Hact. Ined. 3 (1791) t. 61; Seringe in DC., Prod. 2 (1825) 567; Miq., Fl. Ind. Bat. I, 1 (1855) 384; Kuntze, Meth. Speciesbeschr. (1879) 62; Focke, Bibl. Bot.

- 72 (1910) 64, f. 23, '*pirifolius*' as in several other references; Backer, Schoolfl. Java (1911) 455; Koord., Exk. Fl. Java 2 (1912) 321; Cardot in Lecomte, Fl. Gén. Indoch. 2 (1920) 633; Merr., Enum. Philip. Flow. Pl. 2 (1923) 229; Backer & Bakh. f., Fl. Java 1 (1964) 516; Thuan, Fl. Camb., Laos & Vietn. 7 (1968) 43; Fl. Thail. 2 (1970) 55; Iconogr. Cormoph. Sin. 2 (1972) 264; Steen., Mount. Fl. Java (1972) pl. 45-6. — *Dalibarda pyrifolia* (J.E. Sm.) Bl., Bijdr. 17 (1827) 1112. — *R. moluccanus* L. var. *pyrifolius* (J.E. Sm.) Kuntze, Rev. Gen. Pl. 1 (1891) 222. — Type: A Commerson specimen from Java, seen in P.
- Dalibarda latifolia* Bl., Bijdr. 17 (1827) 1112. — *R. rotundifolius* Reinw. ex Miq., Fl. Ind. Bat. I, 1 (1855) 384; Backer, Schoolfl. Java (1911) 455. — *R. moluccanus* L. var. *rotundifolius* (Reinw. ex Miq.) Kuntze, Rev. Gen. Pl. 1 (1891) 222. — *R. pyrifolius* J.E. Sm. var. *rotundifolius* (Reinw. ex Miq.) Focke, Bibl. Bot. 72 (1910) 65. — Type: according to the protologue a specimen from 'Tjanjor' province (= Cianjur, W. Java). In L an obvious type specimen collected by Blume is not present, see note 3.
- R. latifolius* Kuntze, Meth. Speciesbeschr. (1879) 63, 70, 77, nom. illeg.; as far as Java specimens are concerned; not *R. latifolius* Bab., Man. Brit. Bot. ed. 3 (1851) 94. — *R. moluccanus* L. var. *latifolius* (Kuntze) Kuntze, Rev. Gen. Pl. 1 (1891) 222. — Type: probably Kuntze 7049 from Sikkim, in NY.
- R. brevipetalus* Elmer, Leaf. Philip. Bot. 2 (1908) 450. — Type: *Elmer 10099*, holo destroyed, iso seen from A, BM, BO, K, L.
- R. pyrifolius* J.E. Sm. var. *latifolius* Focke, Bibl. Bot. 72 (1910) 64. — Type: not mentioned, based on specimens from Sumatra, Java and Negros. See note 3.
- R. philippinensis* Focke in Elmer & Focke, Leaf. Philip. Bot. 5 (1913) 1617; Focke, Bibl. Bot. 83 (1914) 28; Merr., Enum. Philip. Flow. Pl. 2 (1923) 229. — Type: *Elmer 13606*, holo destroyed, iso seen from A, BM, BO, GH, K, L, P, U.
- R. korinchensis* Ridl., J. Fed. Malay St. Mus. 8 (1917) 32. — Type: *Robinson & Kloss s.n.* from Sumatra, holo prob. in SING, iso seen from BM, K.
- R. pyrifolius* J.E. Sm. var. *sumatranus* Ridl., J. Mal. Br. Roy. As. Soc. 1 (1923) 59, '*sumatrana*'. — Type: not mentioned, probably *Ridley s.n.* from Sumatra, holo in SING?, iso seen from K.
- R. pyrifolius* J.E. Sm. var. *densior* Bolle, Notizbl. Bot. Gart. Berlin 13 (1936) 430. — Type: *Pérelot 1436*, holo in B destroyed, not seen.

Climbing shrub, up to 8 m long, according to some notes longer, up to 30 m. Twigs brown, with rather few, semi-appressed hairs to almost glabrous, rarely more densely hairy (especially when very young); prickles usually few, rarely rather many, small, up to 2 mm long, curved downwards. Minute capitate brown hairs often present on twigs, leaves, inflorescences and flowers. Leaves simple. *Stipules* early falling and leaving a distinct, transversely elliptic scar, 6–9 mm long, ½–1¼ mm wide at base, apically divided into 3–6 pointed, up to 6 mm long, usually spreading lobes, with appressed hairs on surfaces and margin, also with minute, capitate hairs. *Petioles* ½–1 cm long, rarely up to 3 cm, moderately to rather densely covered with semi-appressed hairs, sometimes with 1 or 2 small prickles. *Leafblades* elliptic to ovate, length/width (1.3–)1.6–2.5(–3), 6½–16 by (2½–)3½–8½(–9½) cm; not lobed; base rounded, margin serrate-crenate with 2–5 teeth per cm, apex acute or obtuse and then shortly to rather long acuminate; herbaceous; nervation pinnate, with 5–8 pairs of lateral nerves, the lowermost ones with up to 6 basiscopic, strong side nerves, only rarely the lowermost of these with stronger laterals and the nervation pedate; secondary nerves curving, not reaching the margin, sometimes archingly connected, see note 1, venation widely transverse, finest venation reticulate, indistinct, nerves and veins slightly impressed to flat above, slightly prominent below; sometimes al-

most glabrous, but usually rather densely semi-appressed-hairy on midrib and larger nerves above, the lower surface with appressed to semi-appressed hairs on nerves and larger veins; not distinctly two-coloured when dry. *Inflorescence* terminal, broadly paniculate in shape, a compound raceme of which the last branches are dichasia; the lower 1 to 3 (sometimes up to 5) lateral racemes in axils of leaves (sometimes reduced), the other racemes, and all branchings of higher order bracteate; primary lateral racemes 9–16, the best-developed ones (usually the second from below) with up to 10 side branches (sometimes racemes of dichasia, but usually dichasia); dichasia shortly stalked, with up to 7 flowers, towards the tips diminishing to single flowers; the entire inflorescence up to 30(–40) cm long, the primary laterals up to 12(–15) cm long; rachis and other axes usually rather densely woolly, sometimes with more sparse curly hairs, also with patent straight hairs and with minute capitate hairs, prickles on the main axis and on the branches few or absent; *pedicels* 6–8(–10) mm, densely hairy, with minute capitate hairs; *bracts* up to 9 by 1½–2 mm, apically divided into 3–5 lobes or teeth like the stipules, appressedly hairy outside and with minute capitate hairs, shortly woolly inside; bracteoles 2, at base of pedicel, 1–1¾ by ½–¾ mm, with 2 or 3 teeth or lobes. *Flowers* bisexual; flowerbuds ovoid, pointed. *Hypanthium* saucer-shaped to low cup-shaped, 3–5 mm across, less than 1 mm high, on outside more or less densely shortly woolly, sometimes also with ± appressed and more straight hairs, minute capitate hairs present, (in Celebes specimens also some small prickles present), inside glabrous except around the torus. *Sepals* reflexed to horizontally spreading during anthesis, triangular to ovate, acuminate; 4–7(–11) by 2–4 mm, inner ones narrower than outer ones, outer margins with each 1 or 2 teeth or lobes of up to 2 mm long, inner margins entire, sepals outside with few to many, short, curly hairs and with some to many longer, straight, appressed (rarely more patent) hairs, the covered marginal parts always (rather) densely short-woolly, inside densely shortly woolly at least in the central part. *Petals* erect, elliptic to obovate, 2–5(–7) by ½–2(–3½) mm, almost always distinctly shorter than the stamens, apex (sub)truncate and usually sinuate or notched, rarely acute, not clawed, (greenish or creamy) white, glabrous. *Stamens* (40–)50–80(–100), glabrous; filaments up to 6½ mm long; anthers usually wider than long, ½–¾ mm long, deeply incised at apex and base, dorso-versatile, laterally dehiscent, violet coloured. *Pistils* few, (3–)5–10, rarely up to 17; ovary c. 1 mm long, with usually many long straight hairs on the dorsal side, rarely also with more woolly hairs (Celebes), rarely glabrous (see note 1); style up to 5½(–7) mm, only rarely with hairs in basal part, normally glabrous. *Torus* hardly or not elevated, long-hairy. *Collective fruit* ± ½ cm diam., loose, usually less than half of the ovaries developing, sepals closed around the developing fruits; *fruits* rather large, 3½–4½ by 2½–3½ mm when dry; exocarp rather thick and fleshy, still with some hairs, red; endocarp distinctly and coarsely rugose.

Distribution. Laos, S. Vietnam, Thailand, China (according to Iconogr. Corm. Sin., no specimens seen), Sumatra, Java, Lesser Sunda Islands (seen from Bali, Lombok, and Flores), Borneo, Philippines (seen from Negros, Leyte, and Mindanao), Celebes.

Habitat. Forest and forest edges, at altitudes from c. 500 up to c. 1700 m, rarely collected higher (–2200 m in Celebes).

SUMATRA. Aceh. Kutacane, Bangham 1102, de Wilde c.s. 18251, 18316, 19012; Takengon-Bireun, Bangham 828. – North. Mt Sibajak, Lörzing 15164; Berastagi, Ridley s.n.; Karo lands, Fairchild 170; Pematangsiantar, Iwatsuki c.s. S 254; Lake Toba, Ouwehand 231; N. Tapanuli, Yoshida 2132. – West. Near Padang, Teruya 1403; Mt Kerinci, Bünnemeijer 8056, Jacobson 2490, Robinson & Kloss 197, s.n.; Mt Tujuh, Jacobs 4448.

JAVA. West. Mt Salak, Kuntze 4861; Mt Megamendung, Kuntze 4428, 4783; Mts Gede-Pangrango, different localities, Backer 13659, 23985, Bakhuizen van den Brink 868, Hallier 57, Kern 8030, Lieftinck s.n., van Ooststroom 13855, van Steenis 11699, Winckel 1418; Bandung, Docters van Leeuwen s.n.; Mt Kending, Scheffer s.n.; Pengalengan, Junghuhn s.n.; Taloen, Backer 5698, 26140, Pulle 3074; Mt Malabar, Native coll. 374; Mt Guntur, Danser 6767, Koens 348; Pangencongan, Koorders 26455. – Central. Mt Slamet, Backer 525; Mt Sembung, Backer 12297. – East. Mt Tengger, Mousset 1076.

LESSER SUNDA ISLANDS. Bali. Kostermans c.s. KKSS 156, Sarip 365. – Lombok. Elbert 772. – Flores. Elbert 4289, Kostermans & Wirawan 591, Schmutz 1097, Verheijen 581.

BORNEO. Sabah. Ulu Sungei Danum, Cockburn SAN 85067.

PHILIPPINES. Negros. Cuernos Mts, Elmer 10099. – Leyte. Cabalian, Ramos BS 41477; without loc., Wenzel 909. – Mindanao. Zamboanga Prov., Merrill 8214. Agusan Prov., Mt Urdaneta, Elmer 13606. Davao Prov., Mt Apo, Edaño PNH 1440, Elmer 10572, San Carlos Univ. 594.

CELEBES. South. Mt Lompobatang (Bonthain), Bünnemeijer 11997, 12302.

Notes. 1. The material from Java, Sumatra and the Lesser Sunda Islands is fairly uniform. Also the two Celebes specimens do not present real difficulties. Doubt there is about the status of an old specimen collected by Reinwardt in Java (L, sheet 905. 290-78 and two other sheets possibly belonging to the same collection but without definite data). Miquel described this specimen as *R. rotundifolius* (see synonymy) and Focke recognized it as a variety under *R. pyrifolius*. The specimen has larger flowers (sepals up to 11 mm, petals up to 7 mm long, pistils 12–17), glabrous ovaries and the nervation is different: the primary nerves go straight into the marginal teeth and do not curve upwards at some distance from the margin as usual in *pyrifolius*.

Large flowers were also observed in *Backer* 12297, which may come from the same region (it was collected on Mt Sembung in Pekalongan province, whereas Reinwardt collected his specimen at 'Sambang' or 'Sombang', a locality I could not trace). The Backer specimen is normal *pyrifolius* in other respects and also has hairy ovaries.

A greater number of pistils and the deviating nervation are also found in specimens from Laos and Vietnam. In these specimens the ovaries are very sparsely hairy and sometimes have only one hair.

The nervation character is not always as distinct as could be inferred from the above and on the strength of the slight differences in number of carpels, nor on the differences in hairiness of the ovaries separate species can be based. Recognition of the continental plants as a variety might well be possible and useful but I saw too little material to make a decision (see also note 2). The status of '*rotundifolius*' remains an enigma, it may not be more than a local aberration, about the origin of which only guesses are possible.

2. Closely related, if not conspecific, is *R. hexagynus* Roxb. (syn. *R. hamiltonii* Hook. f.), known from Nepal, Assam and other parts of the Eastern Himalaya and from China. It is characterized by its densely hairy twigs, the finely dentate leaves

with subparallel margins and 8–10 pairs of nerves, and by the few pistils (5–7 only) having only 1 or 2 hairs on their back. It might be better to reduce it to varietal status. One specimen, said to come from Malacca (*Griffith s.n.*), was probably wrongly annotated. Closely related is also *R. benguetensis* Elmer.

3. Focke recognized four varieties under *R. pyrifolius*. Of these the varieties *latifolia* and *rotundifolia* are definitely to be included but of the other two varieties I did not see specimens identified by Focke and their identity remains uncertain for the moment. These two names are placed under 'Dubious names'.

As Focke clearly stated, his var. *latifolius* was not based on *Dalibarda latifolia* Bl., this name being mentioned as a synonym under var. *rotundifolius*.

In L there are some sheets, possibly representing Blume collections. None of them bears the name of the locality 'Tjangor', where the type of *Dalibarda latifolia* was collected. Miquel had to select a new epithet when transferring *D. latifolia* to *Rubus* and he chose *rotundifolia*, a name Reinwardt gave (in ms) to one of his own collections (see note 1).

4. *R. korinchensis* Ridl. is reduced here. The type specimen differs in some points: it has broadly ovate leaves (l/w 1.3–1.4) on long (–3 cm) petioles. The number of stamens is higher than usual but otherwise the flowers seem to conform.

5. On some specimens characteristic leaf-galls are found, which are caused by a gall-mite. The galls are hollow bladders on the upper side of the leaf, purple coloured according to Docters van Leeuwen & Docters van Leeuwen-Reynvaan, *Zoocecidia* of Neth. Indies (1926) 219. On the underside of the leaf the bladders are densely hairy. The galls are known from Java and Sumatra.

6. The fruits are delicious and the species may have value for crossing purposes, according to the label of *Bangham 1102*. Van Steenis (l.c.), however, calls the fruits 'scarcely edible'. A matter of taste?

7. The description given here, was made after only the Malesian material.

8. *Rubus benguetensis* Elmer

R. benguetensis Elmer, Leaflet. Philip. Bot. 1 (1908) 296; *ibid.* 2 (1908) 449; Focke, Bibl. Bot. 72 (1910) 66; Merr., Enum. Philip. Flow. Pl. 2 (1923) 227. – Type: *Elmer 8383*, iso seen from K and L.

Climbing or scrambling shrub, up to 15 m long. Young twigs rather densely to densely covered with long patent hairs mixed with smaller more curly ones, and with a varying amount of patent glandular hairs up to 3 mm long (see note 1); prickles few to rather many, small, c. 1 mm long, rather straight, directed downwards. Leaves simple. *Stipules* often rather persistent, pinnatisect to pinnatipartite with 2–4 lobes on each side, 7–9 by 2–3 mm, appressedly hairy outside, glabrous inside. *Petioles* ½–1(–1½) cm long, indumentum as on the twigs, with some to several prickles. *Leafblades* ovate to elliptic, length/width 1.4–1.7(–2), (6–)7½–13 by (3½–)5–8 cm, up to 17 by 9 cm in sterile shoots (one seen) and there shallowly 3-lobed, otherwise not lobed; base cordate with a basal incision of up to ¾ cm, sometimes subtruncate, basal lobes rounded, margins rather evenly serrate with 4–6 teeth per cm, apex

acute to shortly acuminate, rarely obtuse; herbaceous to stiff coriaceous; nervation pinnate, with up to 6 pairs of lateral nerves, the lowermost ones with c. 5 strong basiscopic side nerves, sometimes (especially Philippines) more clearly pedate, the nerves terminating in the margin or curving upwards and only lateral veins going into the marginal teeth, venation transverse, nerves and veins flat to slightly impressed above, prominent to rather prominent below; upper surface usually sparsely, sometimes more densely hairy with patent to semi-appressed hairs, denser on midrib and nerves, lower surface scarcely to more densely covered with long or short, patent hairs on nerves and veins, and with some to many small prickles on the midrib; not distinctly two-coloured when dry. *Inflorescence* terminal, laxly paniculate in appearance, a compound raceme in which in the lower part the flowers may be replaced by 2- or 3-flowered cymes; the lower 1 or 2 lateral racemes in the axil of a small leaf, the other racemes bracteate; up to c. 20 spaced lateral racemes with up to c. 30 flowers, the axis of the inflorescence terminating in a simple raceme of c. 10 flowers; the entire inflorescence up to c. 35 cm long, the laterals up to c. 15 cm long; rachis of inflorescence and laterals densely hairy with straight and curly hairs and sometimes with glandular hairs (often more distinct than on the twigs); *pedicels* $\frac{3}{4}$ –1½ cm long, densely hairy as the rachises; *bracts* usually tripartite, up to c. 8 mm long, hairy outside, glabrous inside; bracteoles similar but smaller or entire and linear. *Flowers* bisexual; flower buds ovoid, pointed. *Hypanthium* saucer-shaped, 3½–4 mm across, shortly woolly and with long semi-appressed hairs outside, with a ring of hairs around the torus inside. *Sepals* ovate, apex sharply pointed, 6–7 by 2½–5 mm, the inner ones narrower than the outer ones, outer margins with usually 1 minute tooth (sometimes 2 or none) under the apex, inner sepals entire, sepals outside pink to purple, shortly woolly all over and with semi-appressed straight hairs on the not-covered parts, inside shortly woolly. *Petals* none, rarely one or a half-petaloid stamen. *Stamens* 50–80, glabrous; filaments up to 5 mm; anthers $\frac{1}{2}$ –¾ mm long, dorsifixed. *Pistils* (13–)20–30, glabrous; ovary c. 1 mm long; style up to 5 mm long. *Torus* slightly elevated, hairy. *Collective fruit* ± globular, up to 8 mm diam., sepals closing after anthesis and around the ripe fruit; fruits curved, rather large, 3½–6 by 2–2½ mm when dry; exocarp black when ripe, *in vivo* probably fleshy and rather thick, *in sicco* a thin tough layer; endocarp rugose.

Distribution. Borneo (Sarawak, Sabah), Luzon, S. Celebes.

Habitat. In primary forest on slopes, also on open cliffs, several collections from limestone but also on other soil-types, at altitudes ranging from (150–)600 to 2900 m.

Vernacular name (as reported on herbarium label). Rendau emperingat (Borneo, Iban language).

BORNEO. Sarawak. Baram Dist.: Gunong Api, Anderson S 30917, Ashton BRUN 3208, Lehmann S 29442; Gunong Mulu, Winkler 483. Kapit Dist.: Bukit Batu Tibang, Anderson S 28383. – Sabah. Mt Kinabalu, several localities, several collections; Mt Trusmadi, Saikeh c.s. SAN 74467.

PHILIPPINES. Luzon. Isabela Prov.: Mt Moises, Clemens 16721. Mountain Prov.: Benguet, Baguio, Elmer 8383; Benguet, Loher 2237.

CELEBES. South. Rante Pao, Kjellberg 3867.

Notes. 1. Few to very few short glandular hairs are present on twigs and (especially) inflorescences in about half of the specimens seen. *Winkler 483* is deviating in having very many long bristle-like glandular hairs.

2. The species is related to *R. pyrifolius* J.E. Smith, but differs in being apetalous (*R. pyrifolius* has short petals) and in having glabrous pistils. Also related is the Philippine endemic *R. mearnsii* Elmer which has distinctly toothed outer sepals and which is more densely covered with glandular bristles going up to sepals.

3. From the Philippines I saw only few specimens. On this basis it seems a bit risky to postulate the conspecificity of the 15 Bornean specimens with *R. benguetensis*. There are, however, no differences between the Bornean specimens and those from Luzon and Celebes except that in the latter fewer pistils were observed (20–30 in Borneo, 13–17 in Luzon, 15 in Celebes).

9. *Rubus sorsogonensis* Elmer

R. sorsogonensis Elmer, Leaf. Philip. Bot. 10 (1939) 3777. — Type: *Elmer 14607* from Luzon, Mt Bulusan, holo lost, iso seen from A, BM, BO, K, L, P, U.

Climbing shrub. Young branches scattered hairy, with few short prickles. *Stipules* lanceolate, with only one minute tooth on one or both margins, up to 11 by 3½ mm, with short hairs and short glandular hairs outside. *Petioles* 1–1½ cm. *Leafblades* ovate, not lobed, length/width 1.6–1.8, c. 11–12 by 6–7 cm; base cordate, basal incision ½–¾ cm deep, margin grossly serrate, apex acute; herbaceous; nervation pectate, in the larger leaves with 2 main lateral nerves on either side at the base of the midrib, each with c. 4 basiscopic side nerves, the midrib with 4–5 pairs of side nerves, the larger nerves usually terminating in the margin but sometimes curving upwards and only lateral veins going into the marginal teeth, venation widely parallel, nerves and veins flat to slightly impressed above, prominent below; upper surface sparsely and lower surface not very densely long-hairy; brownish olive on both sides when dry. *Inflorescence* terminal, paniculate, the last branchings di- to monochasial, lax, many-flowered, branches up to 12 cm long, branches and pedicels sometimes with stalked glands between the hairs. *Pedicels* 1–1½ cm. *Bracts* up to 15 by 1½ mm, little lobed, rather persistent; bracteoles near the base of the pedicel. *Flowers* bisexual, flowerbuds ovoid, pointed, no glands on the flower. *Hypanthium* saucer-shaped, 4 mm across. *Sepals* triangular, long pointed, 10–12 by 3–4 mm, outer ones with one minute tooth on the uncovered margins, inner ones narrower than outer ones, entire. *Petals* none. *Stamens* c. 100, glabrous; filaments up to 8 mm; anthers ¾ mm, dorsifixed. *Pistils* c. 30, glabrous; ovary 1 mm; style c. 6 mm. Fruits not seen.

Notes. 1. This insufficiently known species appears to deserve recognition. Only one collection seems to exist. It is closely related to *R. benguetensis* Elmer with which it agrees in being apetalous (the original description by Elmer mentions petals where sepals are meant). It is, however, immediately recognized by its distinctly larger flowers.

2. The only specimen was collected in deep woods, c. 450 m altitude, sprawling over the tree tops.

10. *Rubus sundaicus* Blume

R. sundaicus Bl., Bijdr. 17 (1827) 1111; Miq., Fl. Ind. Bat. I, 1 (1855) 383; Focke, Bibl. Bot. 72 (1910) 56, pro min. parte, incl. fig. 19, 20. — Type: *Reinwardt s.n.* from Tidore, Moluccas, holo in L, sheets 905.290-89 & -90.

Twigs appressed cobwebby, prickles very few and very small. *Stipules* not seen, leaving a distinct scar on the twig. *Petioles* 4–6 cm. *Leafblades* ovate, shallowly 3-lobed, length/width 1.3–1.4, 13–15 by 9½–11 cm; base cordate, basal incision 1–2 cm deep, margin rather coarsely serrate-crenate, 4–5 teeth per cm, apex gradually acuminate; herbaceous; nervation pedate with 3 main side nerves on each side at base of midrib, each with 4–5 basiscopic lateral nerves, on the midrib 6–7 pairs of lateral nerves, nerves terminating in margin, venation widely transverse, nerves and veins flat to slightly impressed above, prominent below; upper surface only with hairs on midrib, lower surface with remnants of a cobwebby felt on nerves and veins; leaves brown, below slightly lighter than above. *Inflorescence* a terminal thyrsus consisting of 1–2 dichasia in the axils of leaves and c. 5 dichasia to monochasia in the axils of bracts, the entire inflorescence c. 12 cm long, the spaced laterals up to 2½ cm long, all axes and the up to 1 cm long pedicels hairy. *Bracts* and bracteoles incised from the apex, up to 6 by 3 mm. *Flowers* bisexual, flowerbuds ovoid, pointed. *Hypanthium* cup-shaped, 5–6 mm across, outside densely woolly and with semi-appressed longer hairs, inside glabrous except around torus. *Sepals* triangular, 6½–8 by 3½–5 mm, long-pointed, outer ones with 2 short teeth on each uncovered margin, inner ones narrower than outer ones, entire, outside hairy as outside hypanthium, inside shortly woolly. *Petals* 6–7 by 5 mm, not clawed, irregularly undulate in upper part, glabrous. *Stamens* c. 65; filaments up to 4½ mm, glabrous; anthers ½–¾ mm long, dorsifixed, glabrous or with 1 or 2 long hairs on top. *Pistils* not many (c. 30?), on hairy torus. *Ovary* with long hairs on the dorsal side; style c. 3 mm, hairy at base. Fruits unknown.

Note. Of the two type sheets one was according to the original label collected by Reinwardt in August 1821 on top of the mountain on Tidore I. (sheet -90). The other sheet (-89) bears the printed indication “Java” and has the name *R. sundaicus* in Blume’s handwriting. The two specimens are very much alike and I am quite certain that they are part of one collection. They fit Blume’s description, as far as that goes. Blume mentions as provenance “In insulis Archipelagi Malayensis” and since he did not have several specimens from different islands, this must be read as “exact origin unknown”. Miquel cites the species only from Tidore.

In my opinion it is almost certain that the species was not collected in Java but in the Moluccas where it is far more likely that a species has been collected only once up till now.

The relationship of this plant is not obvious. It resembles *R. cumingii* Kuntze, especially the specimen *Beguin 1546* from Ternate which might be assigned to that species. The type of *R. sundaicus*, however, has distinctly cordate leaves.

11. *Rubus mearnsii* Elmer

R. mearnsii Elmer, Leaf. Philip. Bot. 2 (1908) 448; Merr., Philip. J. Sc. 5 (1910) Bot. 353; Focke, Bibl. Bot. 72 (1910) 74; Merr., Enum. Philip. Flow. Pl. 2 (1923) 228. — Non *R. mearnsii* Standl. (1917) from Kenya. — Type: *Mearns BS 4304*, not seen, all destroyed?

Climbing shrub? (no data). Young *twigs* rather densely patently hairy and with many c. 1 mm long gland-bearing hairs; prickles (rather) many, curved, up to 1½ mm long. Leaves simple. *Stipules* persistent, tongue-shaped, acute, with up to 5 or 6 small teeth on each side, 7–9 by 3–4 mm, appressedly hairy and with glandular hairs outside, glabrous inside. *Petioles* 1–2 cm long, indumentum as on the twigs, with prickles. *Leafblades* broadly ovate to suborbicular, length/width 1–1.3(–1.5), 5–9 by 5–7 cm, not lobed or very faintly so; base cordate, basal incision up to ½ cm deep, basal lobes rounded, margins rather coarsely serrate with 4–6 teeth per cm, apex obtuse to acute; stiff-coriaceous to herbaceous; nervation pedate with on each side at the base of the midrib 2 main side nerves, each having 4–5 basiscopic lateral nerves, on the midrib 4–5 pairs of lateral nerves, nerves terminating in the margin, venation transverse, midrib and nerves slightly impressed, venation almost invisible above, midrib and nerves prominent, venation slightly prominent below; upper surface rather sparsely long patent-hairy on midrib, nerves, veins and veinlets, lower surface sparsely to rather densely long patently hairy on midrib and nerves, sparsely so on the veins and with some prickles on the midrib; not distinctly two-coloured when dry. *Inflorescence* terminal, laxly paniculate in appearance, a thyrus with the lower one or two lateral branches in the axils of leaves, the other ones bracteate, the entire inflorescence up to 52 cm long, lateral branches up to 18, up to 24 cm long, with up to 30 flowers in up to 6 dichasia or cymes, the main axis terminating in a simple raceme of c. 5 flowers; rachis of inflorescence and lateral branches densely long patently hairy, with prickles and with glandular hairs; *pedicels* ½–1½ cm long, long patently hairy and with glandular hairs; *bracts* up to 9 by 2 mm, faintly or more distinctly toothed, appressedly hairy and with glandular hairs outside, glabrous inside; bracteoles similar but smaller. *Flowers* bisexual; flowerbuds ovoid, pointed. *Hypanthium* flat saucer-shaped, 6 mm across, c. 1 mm high, outside with semi-appressed hairs and with glandular hairs, inside glabrous. *Sepals* ovate, outer ones 7–8 by 5–6 mm, with 3–6 teeth of up to 1 mm long on each of the uncovered margins, inner ones narrower, c. 4 mm wide, entire, outside of sepals with appressed to semi-appressed long hairs and with glandular hairs, inside woolly at least in apical and marginal parts. *Petals* none. *Stamens* 60–90, glabrous; filaments up to 5 mm; anthers ½–¾ mm long, dorsifixed. *Pistils* 12–18, glabrous; ovary c. 1 mm long; style up to 4 mm long. *Torus* flat, long-hairy. *Collective fruit* c. 6 mm diam., loose, often only some of the fruits developing, sepals closing after anthesis and remaining closed around the fruits; fruits 4 by 2–2½ mm when dry; exocarp probably fleshy *in vivo*, a rather tough layer *in sicco*, no data about its colour; endocarp rugose.

Distribution. Philippines (only Luzon).

Habitat. Very few data available. According to Merrill (1923) in mossy forest, c. 2400 m altitude. *Quisumbing & Sulit BS 82433* collected along road, c. 2260 m.

PHILIPPINES. Luzon. Mountain Prov.: Pauai, Santos BS 31714; Mt Nangaoto, Sulit PNH 7724; Mt Data, Clemens 17794; Mt Pulo, Ramos & Edaña BS 45016; Mt Singakalsa, Quisumbing & Sulit BS 82433; between Mancayan and Baguio, Ramos & Edaña BS 40494.

Notes. 1. The type specimen could not yet be investigated. Elmer's description closely fits the material at hand, except for the leaf-margins which he calls finely dentate, whereas I would rather describe them as coarsely serrate.

2. *Rubus benguetensis* Elmer and *R. mearnsii* are closely related, as Elmer already noted. A balanced opinion about the possibility of them being conspecific, is not yet possible for want of sufficient material of the former species from the Philippines.

12. *Rubus chrysophyllus* Reinwardt ex Miquel

R. chrysophyllus Reinw. ex Miq., Fl. Ind. Bat. I, 1 (1855) 380; Kuntze, Meth. Speciesbeschr. (1879) 56, 76; Focke, Bibl. Bot. 72 (1910) 74, f. 26; Backer, Schoolfl. Java (1911) 457; Koord., Exk. Fl. Java 2 (1912) 323; Focke, Meded. Rijksherb. 14 (1912) 39; Bibl. Bot. 83 (1914) 28; Merr., Contr. Arn. Arbor. 8 (1934) 69; Backer & Bakh. f., Fl. Java 1 (1964) 516; Steen., Mount. Fl. Java (1972) pl. 45-2. — *R. moluccanus* L. var. *chrysophyllus* (Reinw. ex Miq.) Kuntze, Rev. Gen. Pl. 1 (1891) 222. — Type: *Reinwardt s.n.* from Pontang, Java, here designated as lectotype, holo in L, sheets nr. 905.130-60 & -67. Syntype: *Junghuhn s.n.* from Papandayan, Java, holo in L, sheet nr. 905.130-48.

R. moluccanus L. var. *ochraceus* Bl., Bijdr. 17 (1827) 1109. — *R. chrysophyllus* Reinw. ex Miq. var. *β minor* Miq., Fl. Ind. Bat. I, 1 (1855) 380, comb. illeg. — Type: *Blume s.n.* from Java, holo in L, sheets nr. 905.130-70 & -71.

R. gardnerianus Kuntze sensu Focke, Bibl. Bot. 72 (1910) 92, p.p., as far as (all?) Javanese material is concerned, type not included.

Shrub up to 4 m high, with overhanging branches up to 10 m long. Young twigs with a dense yellowish indumentum consisting of short, curly hairs, (almost) hidden by many long, wavy to straight, appressed to semi-appressed hairs, indumentum disappearing with age, the twigs then brown and smooth; prickles few, less than 1 mm long, recurved, or twigs unarmed. Leaves simple. *Stipules* often rather tardily falling, leaving a distinct scar, ± orbicular in outline, 1–1½ cm long and wide, digitately divided with the lobe on the side of the petiole pinnatifid and much larger and more divided than the other 5–7 lobes from which it is separated by a usually very distinct and deep incision, on the outside with short curly hairs and many appressed longer hairs, inside glabrous or with few hairs. *Petioles* 2–7 cm long, indumentum as on the twigs, with few, up to 2 mm long prickles. *Leafblades* ovate to broadly ovate, length/width 1–1.5 (–1.7 in Sumatra), 7–22 by 7–18 cm, shallowly 3–7-lobed, the incisions in the largest leaves up to 2½ cm deep; base truncate to shallowly and widely cordate, basal incision 1–2½ cm deep, basal lobes rounded, margins rather grossly and unevenly serrate with 3–5 teeth per cm, apex acute; stiff-coriaceous; nervation pedate, with on each side at the base of the midrib 2–3 (–4) main side nerves, each having 3–5 basicopic lateral nerves, on the midrib 4–6 pairs of lateral nerves above the basal ones, nerves terminating in the margin, venation reticulate, nerves and veins distinct to prominent below, impressed above, on upper surface the ± square inter-venial fields distinctly bullately raised; upper surface long-hairy on nerves and veins,

soon glabrous, lower surface densely covered with a closed woolly felt of short curly hairs and with on nerves and veins many thicker and longer, straight to wavy, appressed to semi-appressed hairs, with few scattered small prickles like those on the petiole on the midrib and larger nerves; dark (olive) brown above, yellowish brown underneath when dry, the indumentum also *in vivo* yellowish according to the scarce notes, leaves distinctly two-coloured. *Inflorescence* terminal, a panicle-like, stoutish, compound raceme of which the last branches are dichasial to monochasial, the lower 1 to 4 side branches in the axils of leaves, the others (and all branches of higher order) bracteate, the entire thyrsus up to 35 cm long and up to 15 cm wide; primary side branches up to 12, up to 17 cm long including a peduncle of up to 5 cm, the longest one either the lowermost one or the second, the side branches with a terminal flower and 4–6 dichasial to monochasial laterals each with up to 7(–10) flowers, the dichasia sessile or on a peduncle of 1–2(–3) cm; all inflorescence axes including the pedicels densely covered with patent long hairs, hiding the short curly hairs under them; *pedicels* 1–2 cm long, rarely up to 4 cm under the terminal flower; *bracts* \pm orbicular and hollowed, up to 10 by 10 mm, those under the primary side branches larger and sometimes transitional between normal bract and stipulate reduced leaf; bracteoles up to 2 mm, bracts and bracteoles deeply dentate, densely long appressed-hairy and with short, thin, curly hairs outside, glabrous inside. *Flowers* (see notes 2 and 3) bisexual; flowerbuds ovoid, pointed. *Hypanthium* cupular, (4–)5–7 mm across, 1–2 mm high, densely covered with (semi-)appressed long hairs outside, hiding the also present thinner, curly, short hairs, inside glabrous except a ring of hairs around the torus. *Sepals* erect to slightly spreading, triangular, pointed at apex, outer ones (4–)6–8 by 3–6 mm, with (2–)3–5 teeth on each of the uncovered margins, teeth up to 1½ mm long, inner sepals narrower, c. 3–4 mm wide, the covered margins entire, sepals hardly or not enlarging after anthesis, shortly woolly outside, the uncovered parts also with appressed long hairs, shortly woolly inside. *Petals* erect, \pm orbicular to elliptic, 3–7½ by 2½–5½ mm, about as long as the stamens in anthesis (rarely slightly longer), shorter than sepals, persistent, base tapering or shortly (up to ¼ mm) clawed, apex notched and sometimes with an apiculus in the notch, white, glabrous. *Stamens* 50–100, glabrous; filaments up to 4 mm long; anthers ½–¾ mm long, incised at base, hardly or not so at apex, dorso-versatile, latero-introrse, thecae sometimes shortly apiculate. *Pistils* 50–90, glabrous; ovary 1–1½ mm long; style up to 5½ mm long, in anthesis about as high as the stamens. *Torus* elevated, densely hairy. *Collective fruit* globular, up to 7 mm diam., sepals closing after anthesis, staying erect around the ripe fruits; fruits curved, c. 2½ by 1½ mm when dry; exocarp juicy, a thin layer when dried, yellow to orange, sometimes red; endocarp distinctly rugose.

Distribution. Sumatra, Java, Lombok.

Habitat. In the montane region, collected between (900–)1200 and 2950 m altitude. In light forest and in more open places like thickets, forest edges, clearings, secondary bush, or near craters.

Vernacular names (as reported on herbarium labels). Kupi-kupi (Sum., Karo); baldu-baldu (Sum., Sinabang); pingat, una (both W. Sum.); grunggung kepok (Javanese).

SUMATRA. Aceh. Takengon on Lake Luttawar and environs, Bangham 767, Fairchild 81, Iwatsuki c.s. S 1509, Japing bb 11167, Roelofs bb 12323, van Steenis 5888, Wind bb 9824; Mt Ketambe, de Wilde c.s. 14023; Blangkejeren, Alston 14749. – North. Mt Pintu near Medan, Nielsen 1292; Karo lands, Kabanjahe, Lörzing 6287, 13722; Raya, Lörzing 5036; Berastagi, Bartlett 8665, Beaumée 809, Nur 7273, Ridley s.n., Yates 1562; North Tapanuli, Toba Plain, Hagerup s.n., Huitema 58, 104, Ouwehand 353; Habinsaran, Bartlett 7902. – West. Mt Kerinci, Bünnemeijer 9788, 10005, Frey-Wyssling 115, Meijer 6485.

JAVA. West. Jakarta, Kollmann 701; Mts Gede–Pangrango, many specimens from different localities; Lembang, Korthals s.n.; Mt Patuha, Coert 649, Lörzing 1408; Mt Malabar, Anderson 82, den Berger 753, van Slooten 297; Mt Papandayan, several specimens; Mt Guntur, Burck 418, Karsten 49, Kerkhoven s.n., Kostermans 64; Mt Cikuray, Docters van Leeuwen 8350, Scheffer 19987; Mt Ciremay, Backer 5053. – Central. Mt Kembang, Koorders 37753. – East. Mt Lawu, Elbert 237; Mt Kawi, Docters van Leeuwen 12457; Tengger Mts, different localities, Jeswiet s.n., Kobus 302, Koorders 37752; Semeru Mts, Backer 3735, Jeswiet s.n.; Ijen Mts, Buwalda 7391, van Steenis 12171.

LESSER SUNDA ISLANDS. Lombok. Elbert 2166.

Notes. 1. The species is closely related to *R. moluccanus* L., most obviously with its var. *obtusangulus*. It has been remarked (Backer & Bakhuizen f., 1963) that it could also be classified as a variety of the quite variable *R. moluccanus*. This is certainly true but the bullate leaves and the rather stout, coarse habit with its wide and lax inflorescence permit to separate it rather clearly. Consequently I prefer to keep it as a species.

2. In the Sumatran specimens the flowers are averagely smaller than in Java (outer sepals 4–6 by 3–4½ mm vs. 6–8 by 3–6 mm in Java). Also the leaves have a larger l/w index (in Java 1–1.5, in Sumatra 1.3–1.7). Since the provenance would be the most trustworthy character for identification, I refrained from recognizing a Sumatran variety.

3. Three specimens seen from Java (*Koorders 37752* from Tengger Mts, *Backer 3735* and *Jeswiet s.n.* both from Semeru Mts which belong to the same volcano-complex as Tengger Mts) have only female flowers. They have a large number (150–200) of staminodes with filaments of up to 4 mm and anther rudiments of 0.2–0.3 mm long. The flowers have all sepals entire or the outer ones with one or few minute teeth. The leaves have a truncate base. This might well be a separate variety or even a distinct species but with only these three specimens at hand and without male or bisexual flowers I thought such a decision premature. The features of these specimens have not been entered in the species description, but the specimens have been mentioned in the list of material.

4. According to Van Steenis (1972) the fruits are the most delicious tasting ones of all Javanese *Rubus* and Alston (14749) finds them better than most to eat.

13. *Rubus heterosepalus* Merrill

R. heterosepalus Merr., Philip. J. Sc. 20 (1922) 387; Enum. Philip. Flow. Pl. 2 (1923) 228. – Type: *Ramos & Edaño BS 37609*, holo probably lost, iso seen from A, K, and L.

Climbing or straggling shrub. Young twigs densely covered with many long, straight, patent hairs and few short, thin, curly hairs, prickles up to 2 mm long. Leaves simple.

Stipules (few seen) pinnatipartite with 6–8 lobes on each side, c. 15 by 11 mm, appressed-hairy outside, glabrous inside. *Petioles* 3–5 cm, hairs and prickles as on twigs. *Leafblades* broadly ovate, shallowly 3–5-lobed, length/width 1.2–1.5, 8½–14 by 6½–10 cm; base cordate, the basal incision 1–1½ cm deep, lateral incisions up to 1 cm deep, margin rather grossly serrate, apex gradually acuminate; rather thick and firm; nervation pedate with 2 main side nerves on each side at base of the midrib, each with c. 3 basiscopic lateral nerves, on the midrib 3–4 pairs of lateral nerves; nerves terminating in the margin, venation reticulate, nerves and veins prominent below, sunken above and intervenium bullately raised between them; upper surface with long patent hairs on nerves and veins, lower surface with a densely woven felt of thin curly hairs all over and on the nerves and veins many long, straight, patent hairs, prickles on midrib and stronger nerves; leaves darkbrown above, yellow-brown below when dry. *Inflorescence* terminal, large and rich-flowered, a compound raceme, only the lowermost branch sometimes (one case in three seen) in axil of a leaf, mostly all branches bracteate, main axis terminating in a raceme of some 10–15 flowers, entire inflorescence 10–25 cm long, peduncle 0–3½ cm, side branches 4–6, usually simple racemes, sometimes with cymes instead of flowers, laterals up to 6 cm, with up to 12 flowers; axes densely hairy as the twigs and with prickles; *pedicels* up to c. 8 mm, densely hairy; *bracts* persistent, pinnatisect, c. 15 by 8 mm, with on each side 4–5 lobes up to 5 mm long, long-hairy outside, glabrous inside; bracteoles 2 under each flower, like the bracts but smaller, up to c. 8 by 3 mm. *Flowers* bisexual, flowerbuds ovoid. *Hypanthium* cup-shaped, c. 8 mm across (old flowers), on outside with many patent long hairs above a dense woolly felt, inside with long hairs around the torus. *Sepals* distinctly dimorphous, outer ones 10–14 (according to Merrill –18) by 10–13 mm, with 5 or more lobes on each side, the lobes up to 7 mm long and 1½ mm wide, sometimes lobed again, inner sepals triangular, 10–11 by c. 4 mm, entire, indumentum on outside of sepals as on outside of hypanthium, the patent hairs not on the marginal parts covered in bud, inside woolly at least on part of the surface. *Petals* (few seen, flowers old and petals falling early) much shorter than sepals, c. 6 by 3–3½ mm, gradually narrowing at base, deeply emarginate at apex. *Stamens* c. 70–90; filaments up to 4 mm, glabrous; anthers c. ¼ mm long, dorsifixed, with long hairs on apex. *Pistils* many, glabrous; ovary not seen, only developing fruits; styles up to 4½ mm; stigma bifid. *Torus* hairy. *Collective fruit* probably globular, c. 1 cm diameter (dry), sepals closing after anthesis, spreading widely at ripeness; fruits 3 by 1½ mm; exocarp rather thick; endocarp slightly rugose.

Distribution. Luzon.

Habitat. Mossy forest at 1800 m, according to Merrill (l.c., 1922).

Vernacular names. Tukong (Merrill, 1922), pagit (Ifugao lang.).

PHILIPPINES. Luzon. Mountain Prov.: Mt Polis, Ramos & Edaño BS 37609; Banaue, Conkling & del Rosario PNH 72426.

Note. This species, although known from a few sheets only, seems to be well characterized. It is most closely related to *R. chrysophyllus* Miq. from which it differs most conspicuously in the much larger, much more lobed outer sepals.

14. *Rubus moluccanus* L.

[*R. moluccus latifolius* Rumphius, Herb. Amboin. 5 (1747) 88, pl. 47 fig. 2.]

- R. moluccanus* L., Spec. Pl. (1753) 1197; Seringe in DC., Prod. 2 (1825) 566; Bl., Bijdr. 17 (1827) 1109, excl. var. *ochraceus* Bl.; Miq., Fl. Ind. Bat. I, 1 (1855) 382; Hook. f., Fl. Brit. India 2 (1878) 330, excl. several synonyms, excl. Indian material; Kuntze, Meth. Speciesbeschr. (1879) 33 seq., p.p.; Rev. Gen. Pl. 1 (1891) 222, p.p.; Elmer, Leaflet. Philip. Bot. 2 (1908) 453; Focke, Bibl. Bot. 72 (1910) 88; Backer, Schoolfl. Java (1911) 457, excl. var. *glomeratus* (Bl.) Backer and var. *malvaceus* (Focke) Backer; Koord., Exk. Fl. Java 2 (1912) 324; Merr., Enum. Philip. Flow. Pl. 2 (1923) 228; Backer & Bakh. f., Fl. Java 1 (1964) 516, excl. var. *glomeratus* and *malvaceus*; Thuan, Fl. Camb., Laos & Vietn. 7 (1968) 62; van Royen, Phan. Monogr. 2 (1969) 98, excl. some synonyms; Thuan, Fl. Thail. 2 (1970) 57; Kleinschmidt & Johnson, Weeds of Queensland (1977) 192; Tirvengadam, Fl. Ceyl. 3 (1981) 353. — Type: the plate in Rumphius, loc. cit.
- R. sundaicus* Bl. var. *discolor* Bl., Bijdr. 17 (1827) 1111. — Type: Blume mentions the variety from Mt Gede, Java. The collections by Kuhl & van Hasselt in L which bear the varietal name in Blume's handwriting, must be the type. Sheet 909.112-202 is chosen here as lectotype.
- R. acerifolius* Wall., Cat. (1829) nr. 744, nomen. — Type: 2 sheets in K-W.
- R. hasskarlii* Miq., Fl. Ind. Bat. I, 1 (1855) 381; Kuntze, Meth. Speciesbeschr. (1879) 58, p.p.; Focke, Bibl. Bot. 72 (1910) 98, f. 41. — *R. moluccanus* L. var. *hasskarlii* (Miq.) Kuntze, Rev. Gen. Pl. 1 (1891) 222; Backer, Schoolfl. Java (1911) 458. — Type: Miquel records the species from "mountainous areas in Java, e.g. on Mt. Merapi 4000', collected by Junghuhn" (translated). To which Junghuhn specimen this refers, is unclear, neither in L nor in U there is an obvious type specimen bearing Miquel's identification.
- R. moluccanus* L. var. (β) *obtusangulus* Miq., Fl. Ind. Bat. I, 1 (1855) 383, '*obtusangula*'. — Type: Miquel says that the variety was found on Mts Dieng and Merapi by Junghuhn. In L there are 2 badly labelled sheets, in U there is one sheet belonging to the type as studied by Miquel. The collection in Utrecht (Mt Dieng) may be chosen as the holo-lectotype.
- R. pseudotiliaceus* Kuntze, Meth. Speciesbeschr. (1879) 60. — *R. moluccanus* L. var. *pseudotiliaceus* (Kuntze) Kuntze, Rev. Gen. Pl. 1 (1891) 222. — Type: Kuntze 4901 and 5154, holo in NY. See Backer, Brittonia 3 (1938) 81.
- R. pseudotiliaceus* Kuntze forma *parvifolia* Kuntze, l.c. 59. — Type: Kuntze 4825, holo in NY.
- R. elongatus* auct. non J.E. Smith: Kuntze, Meth. Speciesbeschr. (1879) 59, as far as Java specimens are concerned. — *R. moluccanus* L. var. *elongatus* (J.E. Sm.) Kuntze, Rev. Gen. Pl. 1 (1891) 222, id.
- R. fontinalis* Kuntze, Meth. Speciesbeschr. (1879) 60. — *R. moluccanus* L. var. *fontinalis* (Kuntze) Kuntze, Rev. Gen. Pl. 1 (1891) 222. — Type: Kuntze s.n. from Sindanglaya, Java, holo in NY.
- R. glomeratus* auct. non Bl.: King, J. As. Soc. Beng. 66, ii (1897) 295, p.p. et excl. var. *gracilis* King; Ridl., Fl. Mal. Penins. 1 (1922) 679, and other botanists in Malaysia, see p. 379, note 2.
- R. moluccanus* L. var. *neocaledonicus* Schlechter, Bot. Jahrb. 39 (1906) 132. — Type: Schlechter 15557, not seen.
- R. angulosus* Focke, Bibl. Bot. 72 (1910) 90, f. 35, nom. illeg., non Gremli (1871); Koord., Exk. Fl. Java 2 (1912) 324; Ridl., Fl. Mal. Penins. 1 (1922) 678, f. 59. — Type: not indicated by Focke. He mentioned the species from Malaya, Singapore, Andamans, Sumatra, Bangka, and possibly from Luzon. In L some sheets were identified as this species by Focke, prior to its publication. One of these, Kurz (*Amann*) s.n. from Bangka, is designated here as the lectotype, also of the varietal name replacing this illegitimate species name, see p. 379. Iso seen in U.
- R. glomeratus* Bl. var. *albulus* Focke, Bibl. Bot. 72 (1910) 91. — Type: Boerlage s.n., not seen, and Koorders 28639, seen from BO. See note 8 under *R. glomeratus*, p. 381.
- R. hallieri* Focke, Bibl. Bot. 72 (1910) 94. — Type: Hallier 750 and Jaheri s.n. are mentioned as syntypes, both seen from BO.

- R. hasskarlii* Miq. subsp. *dendrocharis* Focke, Bibl. Bot. 72 (1910) 99, f. 42. — *R. dendrocharis* (Focke) Focke, Bot. Jahrb. 54 (1916) 70; Merr. & Perry, J. Arn. Arbor. 21 (1940) 179. — *R. moluccanus* L. var. *dendrocharis* (Focke) van Royen, Phan. Monogr. 2 (1969) 106, f. 28. — Type: the subspecies was mentioned by Focke from E. New Guinea, Carolines, Bismarck and Fiji Islands, and Mindanao, without citation of specimens. He referred to Schumann & Laut., Fl. Deutsch. Schutzgeb. Südsee (1901) where a number of specimens are mentioned (p. 339). Of these, most of them undoubtedly lost in B, I saw only *Rodatz & Klink 182* from SING, which is var. *discolor* as circumscribed here. This is also in good accordance with Focke's photograph and with the distribution. The neotype of var. *dendrocharis*, designated by Van Royen, *Brass 11387*, is var. *obtusangulus*.
- R. hasskarlii* Miq. subsp. *edelingii* Focke, Bibl. Bot. 72 (1910) 99. — Type: a specimen collected by Edeling in "Bidara Tjina", W. Java. The only specimen seen from this collector and this locality is *HB 19971* in BO.
- R. hasskarlii* Miq. subsp. *padangensis* Focke, Bibl. Bot. 72 (1910) 98. — Type: *Beccari 136*, holo in L, iso seen in K.
- R. indississus* Focke, Bibl. Bot. 72 (1910) 96; Thuan, Fl. Camb., Laos & Vietn. 7 (1968) 53. — Type: *Sapiin s.n. (128)* in BO and *Hillebrand s.n.* in B are syntypes.
- R. peltinervius* Focke, Bibl. Bot. 72 (1910) 94, f. 39, p.p. See under Dubious names, p. 384.
- R. vidalii* Focke, Bibl. Bot. 72 (1910) 98, f. 40; Merr., Enum. Philip. Flow. Pl. 2 (1923) 230. — Type: *Cuming 750*, seen from A, BM, K, L, NY.
- R. philyrinus* Focke, Meded. Rijksherb. 14 (1912) 39, nom. inval.; Focke, Bibl. Bot. 83 (1914) 30, f. 7. — Type: Focke mentions *Elbert 4614* and *4639*. The photograph in Focke (1914) was made from a sheet of the former collection in L. This sheet can be considered as the holotype. In 1912 Focke writes "*R. philyrinus* Focke n. var. vel n. spec." and this makes the name invalid (Art. 34).
- R. guttans* Focke, see Dubious names, p. 384.
- R. ochraceus* Cardot, Not. Syst. 3 (1917) 301; Thuan, Fl. Camb., Laos & Vietn. 7 (1968) 52. — Type: *Chevalier 29452*, holo in P, not seen.
- R. integrifolius* Ridl., Trans. Linn. Soc. II, Bot. 9 (1916) 35. — Type: a specimen collected by Kloss on Mt Jaya (Carstensz), New Guinea, holo in BM.
- R. glomeratus* Bl. var. *grandiflorus* Ridl., Trans. Linn. Soc. II, Bot. 9 (1916) 35. — Type: specimens collected by Kloss on Mt Jaya (Carstensz), New Guinea, holo in BM.
- R. battakensis* Ridl., J. Mal. Br. Roy. As. Soc. 1 (1923) 59. — Type: an unnumbered Ridley specimen from Berastagi, Sumatra, seen from K.
- R. moluccanus* L. var. *gardnerianus* (Kuntze) Meeuse & Adelbert, Bekn. Fl. Java, emerg. ed. IVC, fam. 116 (1943) 16; Backer & Bakh. f., Fl. Java 1 (1964) 517, with Backer as author of the combination. — Type: the variety is based on specimens from Java, thought to be conspecific with *R. gardnerianus* Kuntze, a new name for *R. macrocarpus* Gardn. from Sri Lanka.
- R. moluccanus* L. var. *austropacificus* van Royen, Phan. Monogr. 2 (1969) 113, f. 30, 'austropacifica'. — Type: *van Royen NGF 16444*, holo in L.
- R. moluccanus* L. var. *thespesiaephyllus* van Royen, Phan. Monogr. 2 (1969) 109, f. 29, incl. forma *glabra* van Royen, l.c. 112. — Types: variety: *Koster BW 1174*, holo in L, iso seen from BO; forma: *van Royen & Sleumer 6866*, holo in L.

Climbing or scrambling, rarely creeping shrubs, up to 6 m long or high, rarely up to 10 m (or even longer according to a single annotation). Young twigs covered with a usually dense cobwebby to woolly felt of thin curly hairs, and over it a variable amount of long, thicker, straight, appressed to patent hairs (see varieties), the indumentum (tardily) disappearing with age, the twigs then (reddish or greyish) brown; prickles usually not many, short (–2 mm), (slightly) curved downwards, with a broad, sometimes hairy base. Leaves simple. *Stipules* inserted on the stem, next to

the petiole-base, early falling, 7–17 by 4–12 mm, pinnatilobed to pinnatipartite, with 4–10 lobes on each side, the lobes up to 8 by 1 mm, sometimes the stipules more digitate and the basal lobe on the side of the petiole more or less deeply pinnately divided, hairy outside, glabrous inside. *Petiole* 2–6 cm, rarely longer, indumentum and prickles as on the twigs, sometimes (seen in var. *moluccanus* and var. *discolor*) 1–3 linear appendages, up to 7 mm long, near the base of the petiole (see note 6). *Leafblades* ovate to broadly ovate in outline, length/width ranging from 1.0 to 2.0 (or rarely larger, see varieties), 6–20 by 4–15 cm, usually shallowly 3–5-lobed with lateral incisions not deeper than 1 cm, often hardly lobed or not at all, when lobed the end-lobe widest at the base, var. *angulosus* more distinctly 3–5(–7)-lobed with the incisions in large leaves up to 2 cm deep; base cordate to subtruncate (see varieties), margins serrate with 4–9 teeth per cm, apex acute to acuminate; herbaceous to firm-herbaceous; nervation pedate with on each side at the base of the midrib 2–3 main side nerves, each having 2–4 basiscopic laterals, on the midrib 3–6 pairs of lateral nerves, nerves terminating in the margin, in var. *angulosus* the nervation more distinctly palmate with 7 main nerves and 3–4 pairs of laterals on each of them; venation (widely) reticulate; nerves and veins flat to slightly impressed above, the surface between the veins not or only indistinctly bullately raised, larger nerves rather prominent below; upper surface hairy, especially on the nerves but also in between, the hairs more or less disappearing with age, lower surface with a densely woven felt of long, curly, thin hairs all over, and with on the nerves and veins usually many long, straight, thicker hairs which are appressed to patent (see varieties), with some prickles on midrib (and larger nerves); distinctly two-coloured, herbarium specimens usually darkbrown or dark olive-green above, yellowish brown below, when living the leaves green above and with a light (reddish, greyish, yellowish) brown indumentum below, only in var. *angulosus* (few collector's notes only!) the indumentum said to be whitish. *Inflorescence* a terminal (rarely axillary), usually leafy, compound raceme consisting of up to 12 lateral racemes of which the lower 1–6 in the axils of normal to smaller leaves, the upper 2–8 in the axils of bracts, the main axis terminating in a raceme, rarely all laterals in the axils of bracts; the lateral racemes sometimes compound again (but in nature possibly more often than in the herbarium!), all racemes terminating in a flower; the entire inflorescence up to 20 cm long, more rarely up to 30 cm or even longer (–50 cm), rather narrow; the laterals (much) shorter than the supporting leaves, up to 5 cm long (in the more profuse inflorescences the lower racemes up to 9 cm long), with normally up to 9 flowers but the richest ones with up to 18 or even up to 30 flowers, laterals sessile or peduncle short, rarely up to 1 cm, all axes up to the pedicels hairy as the stems; *pedicels* short, up to 1 cm, growing after anthesis; *bracts* elliptic to oblong, up to 17 by 9 mm, dentate especially in the upper part to pinnatipartite, hairy outside, glabrous inside; bracteoles as bracts but smaller. *Flowers* bisexual; flowerbuds ovoid, pointed. *Hypanthium* cupular, 4–7 mm across, 1–2 mm high, outside densely woolly and with patent to appressed straight hairs, inside with a ring of hairs around the torus. *Sepals* in anthesis erect to more or less recurved in upper part, triangular to ovate with acute or pointed apex, the outer sepals with one or few (rarely up to 6) teeth on each of the

not-covered margins, the teeth at most 3 mm long, covered margins entire, 4–9 by 2–6 mm, inner sepals slightly narrower, entire, sepals slightly growing after anthesis, outside densely woolly and on the not-covered parts also with long straight hairs, inside tomentellous. *Petals* erect in anthesis, usually still present in old flowers ('trapped' between sepals and fruits), suborbicular to elliptic, 3–7 by 3–6 mm, rarely longer or narrower, in anthesis shorter than the sepals or \pm as high, base shortly (–1 mm) clawed or hardly so to gradually tapering, margin undulate, apex rounded or emarginate, white (rarely noted as pink, yellow or red), glabrous or with some hairs outside. *Stamens* erect, 30–185 (see varieties), shorter than petals; filaments up to c. 4 mm long, glabrous; anthers $\frac{1}{4}$ – $\frac{3}{4}$ mm long, dorso-versatile, latero-introrse, mostly with few to several long hairs on top of anther and/or connective, sometimes glabrous. *Pistils* 30–135, glabrous; ovary c. 1 mm long; styles up to 9 mm long, usually as high as sepals in anthesis or slightly longer, rarely distinctly shorter. *Torus* \pm elevated, hairy or glabrous. *Collective fruit* \pm globular, c. $\frac{3}{4}$ (–1) cm diam. when dry, sepals closing after anthesis or remaining slightly recurved at apex, spreading at ripeness; fruit curved, 2–3 by 1–2 mm when dry, exocarp red when ripe, *in vivo* rather thick and juicy, *in sicco* only a thin layer around the rugose endocarp.

Distribution. All over Malesia, extending to Sri Lanka (introduced?), Thailand and Vietnam to the North and West, to Queensland in the South, and to the Carolines, New Hebrides, Fiji and New Caledonia in the Pacific region.

Habitat. Essentially a species from low and medium altitudes, up to 2000 m but occasionally higher.

Notes. 1. *Rubus moluccanus* L. is taken here in the narrowest possible sense, which is much narrower than in Kuntze's opinion (1879) and not much wider than what Focke (1910) had for eyes.

Kuntze, a pioneer of genecology, gave in his book 'Methodik der Speciesbeschreibung und Rubus' (1879) a monograph of the simple-leaved and herbaceous blackberries, in connexion with considerations about the defects of the current methods of species description and proposals for changing them (as a translation of the subtitle runs). The preface says that Darwin and Jordan had completely destroyed the Linnean species concept and that a new natural concept had to take its place. In a sense he can be seen as a fore-runner of the 'new systematics' which made a real start with Turesson, some forty years later.

The first 25 pages of his book are devoted to an explanation of how plant populations as they occur in nature with their relationships to environment, climate, the animal world, etc., can be catalogued by the monographer. His conclusion is that the hierarchy of formal categories of species, subspecies, etc., is not able to reflect fully the natural variation. And as other genecologists, experimental taxonomists, biosystematists after him have done, he proceeds to invent and define categories which are better suited to reflect the variation and its manifold causes. His system of categories is not hierarchical and his definitions are not always clear. A basic category is the Gregiform (Herdenform, Sammelspecies), a type of Finiform with a large amplitudo of variation. A Finiform is a group of plants of which the closest relatives are extinct and which is therefore clearly demarcated. A Gregiform may exist of Locoformen

(differing from their closest relatives by characters which depend on differences in climate or substrate, mostly living in isolation from those relatives), of Typiformen (of which several may grow on the same spot or near each other, since their existence and reproduction are dependent on different animals which makes them constant by means of natural selection), etc. The number of categories (....formen) exceeds twenty, the examples given may indicate that modern notions of population ecology and -genetics are foreshadowed as it were.

After the theoretical chapter Kuntze gives some examples how to describe in practice the variability of species and its causes. This cumbersome method has very justly never gained any support.

Rubus moluccanus, the subject by which he illustrates his views on systematics, is a Gregiform. It is remarkable that one of the very first times that a population-oriented kind of systematics is tried, the author does not elaborate a European group but a group from tropical montane regions. Gregiform can be translated as 'collective species' or 'aggregate species' and the recognition of binomial species within the aggregate *R. moluccanus* s.l. is comparable to the distinction of species within e.g. '*Alchemilla vulgaris* agg.'. As far as these species are formally described (which they usually are, in German) they have legitimate names which must be taken into consideration for priority. For Malesian species no nomenclatorial complications arise, but some names remain uncertain when a type specimen cannot be pinpointed.

A few years later (Rev. Gen. Pl. 1, 1891) Kuntze reduced a large number of his earlier species to the rank of variety under the species *R. moluccanus*. He defends this change of opinion as follows (p. 222, translated): 'I had, with reservation, given specific names to the more or less distinct races [Rassen], but since they constitute a coherent aggregate [Formenkreis] it is strictly speaking more correct to name them as varieties — even when it necessitates the recognition of 70 or more varieties under such a widely conceived species.'

Generally speaking, Kuntze was inclined to give binomials (or later trinomials) to insignificant deviations from what he considered to be the typical form. It is in my opinion, however, not this which is the main objection against his classification. More to be reproached is that he took together in the aggregate a number of species which are so different that they may be put in different subgenera. A circumscription of his Gregiform includes virtually all simple-leaved *Rubus*, as is apparent from p. 33 (paper of 1879): 'Constant characters of *R. moluccanus* are: terete stems with persistent bark, stipules erect, adjacent, petals white (at least in the tropics), styles long, stamens erect, torus hairy, calyx erect after anthesis (i.e. when it does not die off before), berries loosely together, not connate and falling as a whole. From 0 to 4000 m altitude' (translated).

This was probably what made Backer in Java afraid that *R. moluccanus* was going to follow the example of *R. fruticosus* in Europe and America. As is well known, this is in fact a complex of apogamous and sexual taxa, of polyploids and diploids, in which complex a great many species have been described and are still being described. In Focke's system (1914) the complex is put on the level of Section: *Moriferi*, now to be called section *Rubus*. When Backer wrote (1911, translated) after having recog-

nized three varieties in *R. moluccanus*, that 'it would not be difficult to increase the number of varieties indefinitely', he had a grossly exaggerated image of the variability of this species and obviously thought it impossible to recognize 'normal' species under its relatives. Also the publication of Focke's revision of subgenus *Malachobatus* (1910) did not alter his opinion, as witnessed by a *cri de coeur* in 1938: 'These plants are some of the numberless forms by which *R. moluccanus* L. is represented in the Netherlands East Indies. Giving names to all these forms would be quite useless and, moreover, would reduce the Javan *Rubi* to the same desolate condition that the European 'species' of the genus are in, nobody but their creators and frequently not even they being able to distinguish them.'

In my opinion Focke has erected a still very useful framework for the recognition of species in *Malachobatus*, as also witnessed by recent, regional revisions for New Guinea (van Royen, 1969), Southeast Asia (Thuan, 1968 & 1970), and Sri Lanka (Tirvengadam, 1982). This is not to say that all species Focke recognized still have to stand: many of course have now to be reduced – as is always the case after so many years of intensive collecting. It means, however, that one need not be afraid of recognizing a fair number of species, large and small, exactly as in 'ordinary' genera.

It is in the nature of a polyploid, partly apogamous complex that the variability is hard to be squeezed in the harness of formal classification. Whether there is not a more sensible taxonomic solution than the recognition of hundreds of taxa on the species level, is a matter of opinion. I myself am of the opinion that the taxonomist must in these cases be content with leaving un-named and un-formalized some of the variation which can be recognized. To be more precise: the system of classification of section *Rubus* could also be used by non-botanologists if there were only specific names for what now are called series and occasionally subseries.

2. As said in note 1, the species is taken here in a narrow sense. I have made a conscious effort to exclude all relatives which can be delimited and which can be keyed out without having too many doubtful and intermediary cases and without having a key which can only be used after many years of experience. *Rubus moluccanus* is, in this sense, almost restricted to the Malesian area and it can be divided into four varieties.

On the Asian continent a number of related species occur. Most closely related seems to be *R. rugosus* J.E. Smith, which differs among others by its stiff leaves which are bullate above because of the deeply impressed nerves and veins (see also note 1 under *R. malvaceus*, p. 376). Species as *R. multibracteatus* Lév. & Van. (Thailand, Laos, Vietnam), *R. fairholmianus* Gardn. (Sri Lanka, India), *R. reflexus* Ker (China), *R. chevalieri* Card. (Vietnam, Thailand), *R. palmatifolius* Thuan (Vietnam) can probably be kept apart too. Whether *R. indicus* Thunb. merits recognition, as Tirvengadam advocates for Sri Lanka, is dubious to me.

On the other side of the distribution area we find *R. hillii* F.v.M., sometimes placed in the synonymy of *R. moluccanus*. Since it can easily be recognized by the shape of its leaves, I have kept it as a separate species. A note by the side may be made about this Australian species. The real *R. moluccanus* var. *moluccanus* also occurs in Australia, at least in Queensland, and I suspect that Australian botanists have

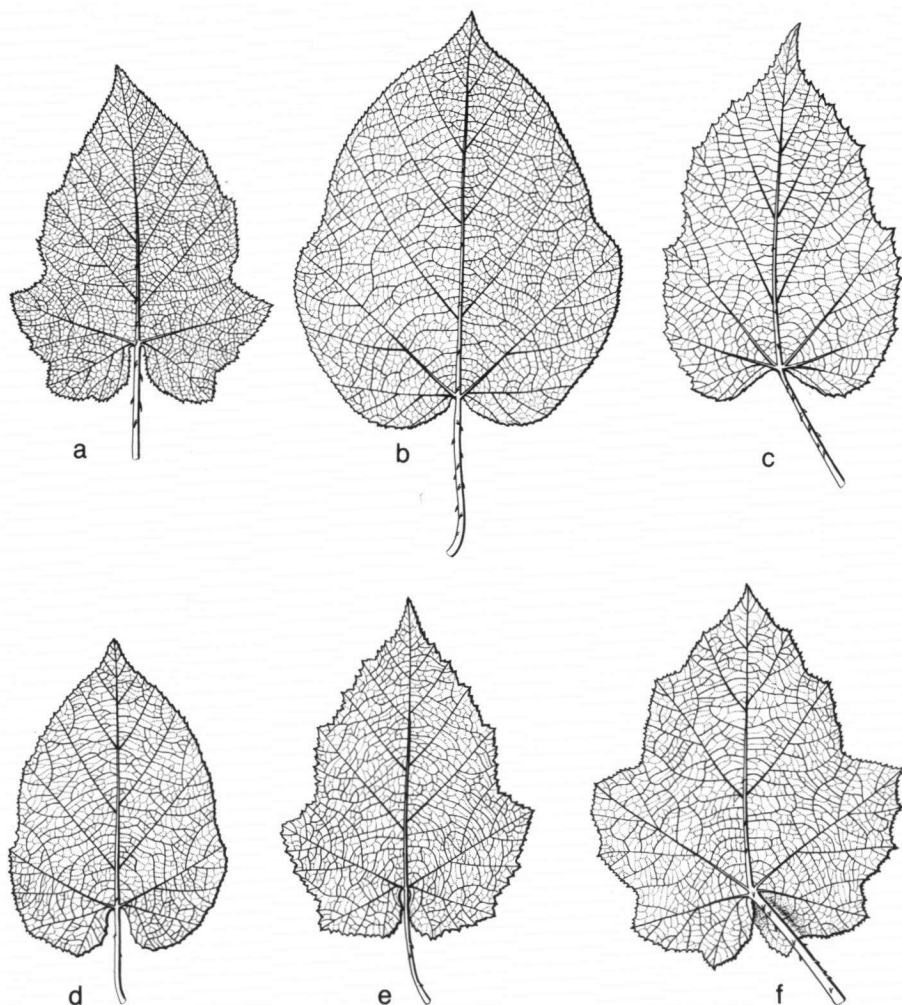


Fig. 1. *Rubus moluccanus*. Leaves of var. *moluccanus* (a, Bartlett 8350; b, Purseglove 4259), var. *obtusangulus* (c, Brass 4933), var. *discolor* (d, Jaag 1454, e, Bakhuizen van den Brink 3374), var. *angulosus* (f, Hardial 641). All $\times \frac{1}{2}$. Indumentum omitted.

not always discriminated the two species. The clearly 3-lobed leaves with the end-lobe longer than half the leaf-length and widest above the base, distinguish *R. hillii*. The colour of the petals in *hillii* remains rather doubtful: several descriptions, starting with that by Von Mueller, state that the flowers are red or white, others say 'white' only. The photograph in Cochrane c.s., Flow. & Pl. of Vict. (1968) shows white petals, that in Rotherham c.s., Flow. & Pl. of N.S.W. and S. Queensl. (1975) purplish ones.

3. The chromosomes of *R. moluccanus*, as circumscribed here, have never been counted and for other species of subg. *Malachobatus* there are only a few counts published. It seems to be clear that $x = 7$ in the subgenus, as in other parts of the genus. Nybom, Bot. Notis. 133 (1980) 47, reported high-polyploid numbers ($2n = 56, 70, 98$) for populations from Sri Lanka and made a speculating remark on the possibility of apomixis in *Malachobatus*. I would not exclude this possibility but on the other hand there is no positive indication whatever at the moment. Apogamous reproduction may be linked with polyploidy but this statement may not be reversed. The known cases of complexes with facultative apogamy are mostly of genera in Europe and North America and it seems that either the availability of new land behind retreating ice after the Pleistocene, or the production of new habitats by human (agricultural) influence, is in some way operative in the creation of these apogamous complexes. Now *R. moluccanus* is a species which certainly must have become more wide-spread with the increase of human influence: burning practices for hunting, ladang system of agriculture, building of roads, deforestation, create room for *R. moluccanus* plants. It is therefore not impossible that *moluccanus* is partly and facultatively apogamous, but the experimental testing of such a speculation has yet to begin.

In this connexion it may be not without value to report that I met some cases of part-sterility. The specimen *Williams 409* from Luzon (var. *moluccanus*) appeared to have closed anthers on normal-sized stamens, while ripe fruits were already present in the same flower, which looks as if functionally female flowers were present there. Also some New Guinean specimens of var. *obtusangulus* appeared to have flowers not producing pollen, resp. with not developing ovaries. Field observations are urgently needed.

4. As can be seen from the key to the varieties, the latter are based on leaf characters, especially the shape (fig. 1) and the indumentum. All *R. moluccanus* and most of its relatives have a double indumentum in the sense that the underside of the leaves is covered with a dense, woolly felt of curly hairs. On the nerves and veins there are also other hairs present, straight, longer and thicker than those of the felt. These hairs may be appressed or patent. See figure 2. In most cases it is not difficult to decide between the two possibilities, but intermediates and dubious cases occur. I found it most reliable to look for the situation not on the largest nerves, but on the lower order veins.

For a decision on the angle between the basal lobes, overlapping, sharp, obtuse or even subtruncate, it is necessary to see a number of leaves well below the inflorescence.

In most herbarium specimens only last order branches, terminating in an inflorescence, are present, the so-called floricanes. Primocanes, one season older and bearing the flowering twigs, are rarely collected but there are indications that the leaves on them are not only larger but may also be of different shape.

Scrappy specimens may not always be identified as to variety, but also better specimens sometimes give difficulties with the taxonomic decision. Intermediates occur, whether they are hybrids or not, and actually this is the exact reason for the varietal status of the four taxa.

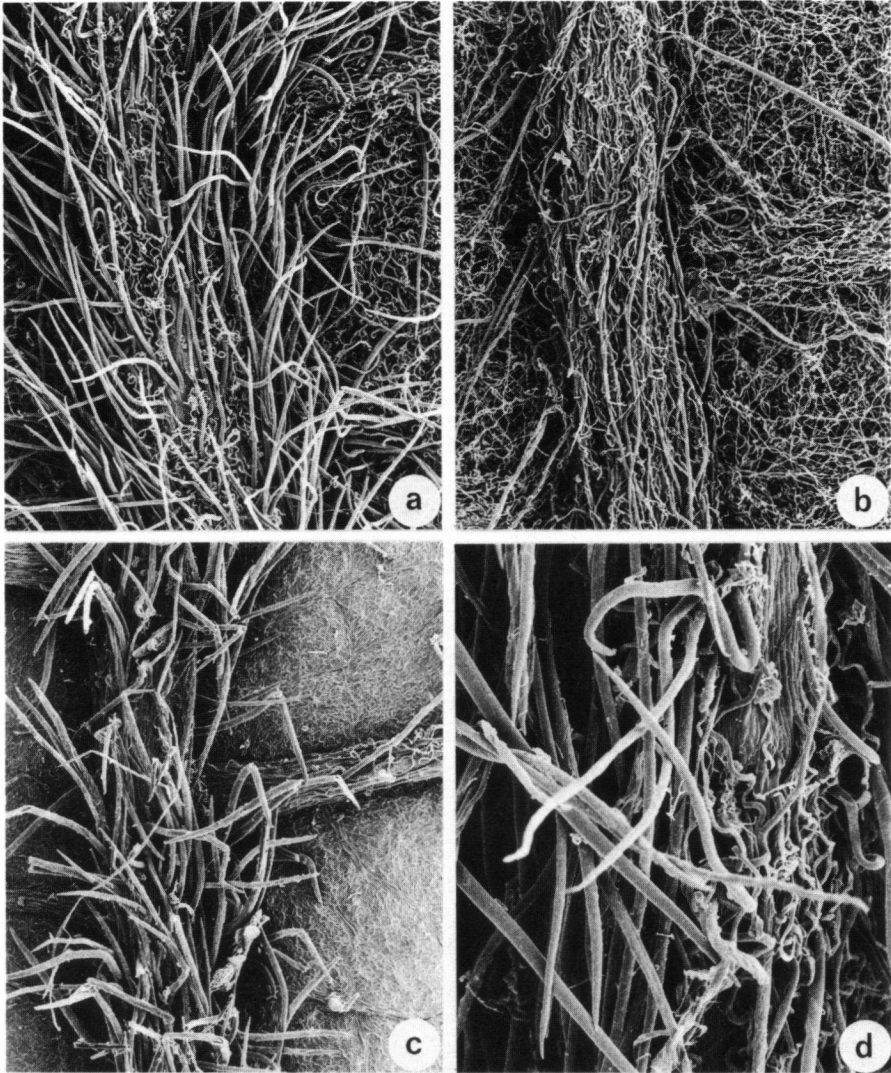


Fig. 2. Indumentum on lower side of leaf, on and near a primary side nerve. a. *Rubus moluccanus* var. *moluccanus* (Hoogland 4561), b. *R. moluccanus* var. *obtusangulus* (Hoogerwerf 452), c. and d. *R. glomeratus* (Raap 673 resp. Alston 13911). a, b, c $\times 40$, d $\times 120$.

In passing it may be remarked that Van Royen (1969, p. 84, 112) considered it probable that var. *thespesiaephyllus* (my var. *discolor*) actually is a hybrid swarm between var. *moluccanus* and var. *dendrocharis* (my var. *obtusangulus*), and that the three varieties are gradually developing into separate species.

In some of the varieties the leaves vary from unlobed to lobed, or the length/width index varies rather much. See the notes to the varieties, where appropriate.

5. The choice of the epithet *moluccanus* for one of the varieties depends on the interpretation of Rumphius' plate and description. As to the leaf-shape his plate could depict a lobed form of either var. *moluccanus* or var. *discolor*, and Kuntze's choice (1879, p. 58) was for the latter. He said that a specimen collected by Doleschall ('Doleschau' says Kuntze) in Ambon, and present in W, is *R. hasskarlii* Miq. and that this could be Rumphius' *R. moluccus latifolius* on which Linnaeus based *R. moluccanus*. The leaf-shape of Doleschall's specimens is certainly like the plate, but so is that of *Robinson 270*, which was considered by Merrill and also by Van Royen, to be representative for *R. moluccus latifolius* and thus a kind of topotype of *R. moluccanus*. *Rubus hasskarlii* is my var. *discolor* and that it is not var. *moluccanus* rests mainly on the sentence in Rumphius' description in which he says that the leaves are 'van onderen zeer ruyg' (translated: very shaggy below, in the Latin description it says: *inferne quam maxime rugosa*). This is not a qualification fitting to var. *discolor* which has a very appressed indumentum.

6. The linear appendages on the petioles mentioned in the description were first noted by Van Royen (1969, see p. 104). I saw in several specimens leaves with normal stipules and at the same time with these appendages, so there is no question at all that the latter can be compared to stipules. Van Royen's conclusion that the occurrence of the appendages obscures the delimitation between sections *Malachobatus* and *Idaeobatus* (which has often narrow stipules on the petiole) cannot be endorsed. However, I cannot offer a morphological explanation of these strange appendages, which have been seen in var. *moluccanus* (Malaya, New Guinea) and var. *discolor* (New Guinea).

KEY TO THE VARIETIES

- 1 a. Leaf-base subtruncate to shallowly cordate, the basal lobes making an obtuse angle. The straight hairs on nerves and veins below appressed
 - c. var. *obtusangulus*
- b. Leaf-base cordate, the angle between the margins of the basal lobes sharp . . . 2
- 2 a. The straight hairs on nerves and veins below appressed to semi-appressed
 - b. var. *discolor*
- b. The straight hairs on nerves and veins below patent 3
- 3 a. The basal lobes of the leaves distinctly overlapping or at least touching each other. Leaves 3–5(–7)-lobed, the lateral incisions up to 2 cm deep, the nervation 7-palmate to -pedate d. var. *angulosus*
- b. The basal lobes of the leaves not overlapping, their margins parallel or making a sharp angle. Leaves not lobed or shallowly 3–5-lobed, the lateral incisions ½–1 cm deep, the nervation 5- or 7-pedate a. var. *moluccanus*

a. var. moluccanus

R. moluccanus L. var. *moluccanus*: van Royen (1969) 102, f. 27, excl. some synonyms.

R. moluccanus L. (1753); Seringe in DC. (1825); Blume (1827) excl. var. *ochrascens* Bl.; Miquel (1855) excl. var. *obtusangulus* Miq.; Kuntze (1879) p.p.; Focke (1910); Backer (1911) p.p.; Merrill (1923) p.p.; Meeuse & Adelbert (1943) p.p.; Backer & Bakh.f. (1964) p.p.; Thuan (1970) p.p.; Kleinschmidt & Johnson (1977); Tirvengadam (1981).

R. acerifolius Wall. (1829) nomen.

R. glomeratus Bl. var. *albulus* Focke (1910).

R. hallieri Focke (1910).

R. vidalii Focke (1910).

R. glomeratus auct. non Bl.: Ridley (1922).

R. battakensis Ridley (1923).

R. moluccanus L. var. *gardnerianus* (Kuntze) Meeuse & Adelbert (1943); Backer & Bakh.f. (1964).

R. moluccanus L. var. *austropacificus* van Royen (1969).

For complete references, see under the species.

Young twigs and nerves and veins on the lower leaf-surface with patent to semi-patent, long, straight hairs (apart from the underlying cover of thin, curly hairs). Leaves shallowly 3–5-lobed or not lobed at all, length/width (1.0–)1.1–1.4(–1.8), basal incision narrow with parallel margins or a sharp angle between them (see note 1). Sometimes all lateral racemes in axils of bracts and the inflorescence a protracted leafless thyrsus. Stamens 30–150(–200), anthers hairy at apex or glabrous.

Distribution. Sri Lanka, Thailand, Vietnam (?), Sumatra, Malaya incl. Penang I. and Langkawi I., Singapore, Java, Lesser Sunda Islands, Borneo, Philippines, Celebes, Moluccas, New Guinea, New Britain, Solomon I., Carolines, Fiji I., Australia (Queensland). See note 3.

Habitat. Forest edges, secondary forest, lighter places in primary forest, e.g. riverbanks, open places like thickets, roadsides, lavastreams, heath-like vegetations, from sea-level up to c. 2000 m altitude, very rarely higher.

Vernacular names (as reported on herbarium labels). Anar (Sum., Aceh), sihupi tatas (N. Sum.), pancaringin and variants (W. Sum.), begang (Sum., Lampung); duri berumbit, akar bulau mudu (Malaya); garonggong (E. Java); bandilgede (Bali); seberang abit, empeninget, raja bikaram (all Sarawak), lintagu and variants, kampit sapi (both Sabah), impahringat (Sabah, Iban), dila-dila-palian (Sabah, Tenggara), langamit besar (Sabah, Kedayan), surmit (Sabah, Murut), tagoh-tagoh (Sabah, Dusun), tamparengat (W. Indon. Borneo); pagal (Luzon), sapinit (Mindanao); mandiwines (New Guinea, Biak lang.), tjiheu tjiheup (New Guinea, Merauke), woipige (New Guinea, E. Sepik), kalo (New Guinea, E. Highl., Gogodalo), Mangat-mangat (New Guinea, West. Dist.); faragau and variants (Solomon I.).

SUMATRA. Batu I. Raap 200. – Aceh. Takengon, Bangham 685. Gajo Lands, van Daalen 18, van Steenis 9361, 9441. – North. Kabanjahe, Batten Pool s.n.; Toba Lake, Bangham 1237; Karo Plain, Raya, Lörzing 5006; Berastagi, Bangham 982, Ridley s.n., Yates 1524; Simelungun, Yates 1193 (mixed coll.); Hutaginjang, Bartlett 8350, Ruttner 237; between Tutupan and Simakuk, Bartlett 7538; Doloksanggul, Huitema 57. – West. Tanangtalu (Mt Talakmau), Bünne-meijer 1077; Mt Singgalang, Schiffner 2020, 2029; Mt Marapi, Bünne-meijer 4627; Padang, Mt

Danau, Bünnemeijer 3576; Padang, Mt Gombak, Bünnemeijer 5744. — *Lampung*. Mt Sugih, Gresdorf 156; Wailima, Iboet 459; Mt Tanggamus, Jacobs 803t.

MALAYA. Perak. Maxwell's Hill, Burkill & Haniff 12609, 12778; Thaiping, Brooks s.n., Hervey s.n., Ridley s.n.; Sungei Krian, Spare SF 36043; Gunong Hijau, Anderson 54; Bukit Bireh, Fox 167. — *Trengganu*. Sungei Belantan, Shah c.s. MS 3332. — *Pahang*. Fraser's Hill, Burkill & Holtum 8564, Keng c.s. 55, Ogata KEP 110329, Purseglove 4113, 4259, Shah 2779; Raub track, Machado s.n.; Temerloh, Ridley 2691. — *Selangor*. Bukit Kuta, Ridley s.n.; Gunong Semangko, Curtis s.n., Ridley s.n. — *Negri Sembilan*. Gunong Telepak Burok, Maxwell 77-153; Bukit Tangga, Ridley s.n.; Gunong Angsi, Nur SF 11650; Kuala Pilah, Mat Asri KEP/FRI 21895. — *Langkawi*. I. Gunong Raya, Haniff & Nur SF 7200. — *Penang* I. Several specimens from different localities.

SINGAPORE. Jurong, Ridley 43.. (illegible).

JAVA. West. Malabar, Pulle 3175; Mt Wayang, Smith & Rant 613; Mt Mandalagiri, Lam 75. — *Central*. Salatiga, Docters van Leeuwen s.n.; Boja, Beumée 3845; Mt Merbabu, Coert 151, Docters van Leeuwen 259; Selo, den Berger 68a; Mt Merapi, Coert 129, Junghuhn s.n.; Muntilan, Backer 12056, van Rijckevorsel 47. — *East*. Mt Pandan, Thorenaar 114, 154; Tengger Mts, Tosari, Ridley s.n.; Mt Lamongan, Jeswiet s.n.; Ridjengan, Koorders 43056; Pancur-ljen, Koorders 28639; Mt Merapi, Backer 25309; Bawean I., Buwalda 3018.

LESSER SUNDA ISLANDS. Bali. Sarip 297, 410. — *Sumbawa*. Colfs 294. — *Flores*. Verheijen 688, 3631. — *Timor*. Bosarchitect Kupang 11.

BORNEO. Sarawak. Kuching, several collections; Belaga, Ashton S 17712; Perungen, Brooke 8510; Mt Poi, Clemens 20152; Mt Lotung, Cockburn SAN 83100. — *Sabah*. Keningau, Bayak 1237, Nordin Abas SAN 85781, Puasa-Angian 3881; Mt Rara, Chow SAN 75689; Sandakan, Cuadra A 1079; Tawau, Aban Gibot 37088, SAN 79741, Kadir A 2048; Jimpangah, Apostol 2406; Kuala Napagun, Keith 9343; Kinabalu area, Clemens s.n., Griswold 19, Poore H 112. — *Indonesian Borneo*. West. Pontianak, Main 2039, Mondri 260; Sanggau, Hallier 750; Malawi River, Winkler 379; Serawai River, Winkler 273; Semitau, Jaheri s.n. — *Central*. Banjarmasin, Motley 774. — *East*. Berau, Mt Njapa, Kostermans 21291; Tabang, Murata c.s. B 1137; Sebulu, Murata c.s. B 557, B 617; Mt Beratus, Meijer 625; Jembayan, Endert 1460; Sungei Penyangulon, Rutten 74; Pamaluan, Rutten 105. — *South*. Muarauya, Kartawinata 909, de Vogel 792, 914; Mt Besar, Murata c.s. B 4355; Pagat, Grabowsky s.n.

PHILIPPINES. Luzon. Isabela Prov.: San Mariano, Ramos & Edaña BS 47072. — *Mountain Prov.*: Ifugao Subprov., Conklin & Buwaya PNH 78635; Benguet Subprov., Mearns BS 4308, Merrill 4725. — *Pampanga Prov.*: Mt Pinatubo, Clemens 17398, Elmer 22115, Loher 5986. — *Bataan Prov.*: Mt Mariveles, several specimens. — *Rizal Prov.*: Bosoboso, Loher 2245, Merrill Spec. Blanc. 161, Vidal 295; Antipolo, Merrill 1648; Pilea, Ramos BS 3302; Mt Irig, Ramos BS 42201. — *Camarines Sur Prov.*: Her-it River, Edaña BS 76435; Panagan River, Edaña BS 76379. — *Tayabas Prov.*: Cuming 750. — *Albay Prov.*: Cuming 1158. — *Palawan*. Victoria Mts, Sulit PNH 12388; no loc.: Foxworthy BS 659. — *Panay*. Capiz Prov.: Martelino & Edaña BS 35411, Ramos BS 46197, Ramos & Edaña BS 30997. — *Negros*. Mt Katugasan, Edaña PNH 21778; no loc.: Curran FB 19099. — *Cebu*. Mt Mauyog, San Carlos Univ. 126. — *Mindanao*. Misamis Prov.: Mt Malindang, Mearns & Hutchinson FB 4559. — *Bukidnon Prov.*: Avelino, Britton 434; Pangantucan, Añonuevo PNH 13505. — *Davao Prov.*: Mt Apo, Elmer 11580; Mt Mayo, Ramos & Edaña BS 49494.

CELEBES. *Central*. Mt Nokilalaki, Bloembergen 4019, 4038; Mt Roroka Timbu, van Balgooy 3168. — *South*. Mt Pokapinjang, Kjellberg 3873; Rantelemo, Kjellberg 1547; Lombasang, Bünnemeijer 11811; Mt Lompobatang (Bonthain), Bünnemeijer 12089; Malino (E. of Ujungpandang), Rant 420; Salayar I., Docters van Leeuwen 1732. — *Buton* I. Kabungka, Kjellberg 221.

MOLUCCAS. *Ceram*. Kiandrata, Buwalda 5884. — *Ambon*. No loc., Robinson 270, Chr. Smith s.n., de Wiljes-Hissink 97. — *Kai* I. Nuhucut I., Elat, Jensen 331.

NEW GUINEA. *Irian Jaya*. Misool I.: Fakal, Pleyte 1062. — *Vogelkop Peninsula*: Sorong, Pleyte 388, 462; Manokwari, Gibbs 6212, Schram BW 9493, Teysmann 7811; Teminabuan, Kalk-

man BW 6325; Ije River, van Royen & Sleumer 7624. – Yapen I.: Woda, Koster BW 11245. – Fakfak Prov.: Arguni, Aet 622. – North. Van Rees Mts, Docters van Leeuwen 9269; Otken River, Docters van Leeuwen 11369; Rouffaer River, Docters van Leeuwen 9921. – Snow Mts: Wissel Lakes region, Eyma 5113. – South. Lorentz River, von Römer 586, Versteeg 1458, 1709; Hellwig Mts, von Römer 841. – Merauke area: Kaisah, Anta 42; Kelihi, Anta 236. – Papua New Guinea. West Sepik Prov.: Torricelli Mts, Schlechter 14449 (mixed coll.). – East Sepik Prov.: Ambunti, Hoogland & Craven 10226. – Madang Prov.: Finisterre Mts, Sayers NGF 21260. – Morobe Prov.: near Wau, Henty NGF 9895, White NGF 1470; near Lae, Hartley TGH 10121, Womersley NGF 43602; Atsera Range, Womersley NGF 3201; Markham Point, van Royen NGF 20147. – Western Highl. Prov.: Jimi valley, Manner & Street 215; Mount Hagen Station, Dosedla 45 B, Hoogland & Pullen 5814. – Eastern Highl. Prov.: Kassam pass, Stauffer & Sayers 5575; Kindiawa, Henty NGF 20615; Arau, Brass 32005. – Western Prov.: Kiunga Subprov., Millar NGF 35433; Wassi Kussa River, Brass 8427; Morehead, Pullen 7227; Balimo Subprov., Baldwin UPNG 5724; Daru Subprov., Foreman & Stocker LAE 60416. – Central Prov.: Lake Myola, Croft NGF 34529; Koitaki, Carr 11973; Boridi, Bisiatabu, Brass 580; Mafulu, Brass 5521, Carr 14268; Sogeri region, Forbes 12 (mixed coll.), Schodde 2965; Port Moresby Subprov., Croft & Vinas NGF 34845, Fallen 221, Isles & Vinas NGF 34455. – Northern Prov.: Kokoda Subprov., Wiakabu & Kairo LAE 70228; Tufi Subprov., Hoogland 4561, Womersley & Katik NGF 43980; Saiho, Hoogland 3483. – Milne Bay Prov.: Gwariu River, Brass 23749. – D'Entrecasteaux I.: Fergusson I., Brass 25954, 27279. – Louisiades: Misima I., Brass 27553; Rossel I., Brass 28590.

BISMARCK ARCHIPELAGO. New Britain. Malabunga, Dept. Agricult. A 20.

SOLOMON ISLANDS. Bougainville. Tuareruku, van Royen NGF 16444. – New Georgia group. Baga I., Whitmore's coll. BSIP 3015; Kolombangara I., Womersley & Whitmore BSIP 1195; New Georgia, Maenu'u BSIP 6098. – Santa Isabel. Huali, Corner 2832. – Malaita. Raunako, Runikora c.s. BSIP 10703; Aliqroqro, Brown W/137; Quoi-mon-apu, Kajewski 2377. – Guadalcanal. Gold Ridge, Brown 2483. – San Cristobal. Star Harbour, Brass 3102.

Notes. 1. The leaves vary from \pm unlobed to distinctly (although always shallowly) 3- or 5-lobed. In view of the many intermediates it is impossible to use this for a distinction of more varieties. The basal incision shows nearly always a sharp angle (less than 90°) but mainly in the Philippines the angle may be larger. Long leaves (length/width more than 1.4) have especially been observed in Malaya and Borneo.

2. Some specimens approach var. *angulosus* and the shape of the leaf-base is not always decisive, especially not in poor specimens. The two varieties differ also in the habit of their inflorescences: compact in var. *angulosus*, more lax with longer pedicels in var. *moluccanus*.

3. According to Tirvengadam (1981) the variety (cited as *R. moluccanus*) was recently introduced in Sri Lanka. He (and I) saw only two specimens from the island, both collected in 1972.

It does not seem improbable that also in Queensland the variety is not really native. According to Kleinschmidt & Johnson (1977) it is a native species but the statement may be influenced by confusion with *R. hillii* (see note 2 under the species, p. 351).

The mention of Vietnam under the summary of the distribution is based on *Kuntze 3818* from 'Turong' (= Tourane, in Annam), a sterile specimen.

4. The fruits are edible but have a poor flavour according to several collectors. Young fresh leaves are a cure of diarrhoea (Borneo, *Mamit S 33363*). Twigs may be used for bundling firewood (Philippines, *Conklin & Buwaya PNH 78635*) and are used for catching bats (Philippines, *Britton 434*).

b. var. *discolor* (Blume) Kalkman, *comb. nov.*

- R. sundaicus* Blume var. *discolor* Blume, Bijdr. 17 (1827) 1111, basionym.
R. moluccanus L. sensu Koorders (1912) p.p. (2 out of 4 specimens cited); sensu Merrill (1923) p.p.
R. hasskarlii Miquel (1855); Kuntze (1879) p.p. — *R. moluccanus* L. var. *hasskarlii* (Miq.) Kuntze (1891); Backer (1911) p.p.; Backer & Bakh. f. (1964) p.p.
R. pseudotiliaceus Kuntze (1879) excl. forma *parvifolia* Kuntze. — *R. moluccanus* L. var. *pseudotiliaceus* (Kuntze) Kuntze (1891).
R. elongatus auct.: Kuntze (1879) p.p. — *R. moluccanus* L. var. *elongatus* (J.E. Smith) Kuntze (1891) p.p.
R. fontinalis Kuntze (1879). — *R. moluccanus* L. var. *fontinalis* (Kuntze) Kuntze (1891).
R. moluccanus L. var. *neocaledonicus* Schlechter (1906).
R. hasskarlii Miq. subsp. *dendrocharis* Focke (1910). — *R. dendrocharis* (Focke) Focke (1916).
R. hasskarlii Miq. subsp. *edelingii* Focke (1910).
R. hasskarlii Miq. subsp. *padangensis* Focke (1910).
R. indississus Focke (1910); sensu Thuan (1968) as far as Java specimens are concerned.
R. phylirinus Focke (1912).
R. glomeratus Blume var. *grandiflorus* Ridley (1916).
R. moluccanus L. var. *thespesiaephyllus* van Royen (1969), incl. forma *glabra* van Royen (1969).
For complete references, see under the species.

Young twigs and nerves and veins on the lower leaf-surface with appressed (rarely semi-appressed), long, straight hairs (apart from the underlying cover of thin, curly hairs). Leaves shallowly 3–5-lobed, sometimes hardly lobed, rarely more distinctly lobed, length/width (1.0–)1.2–1.5 (–2.5, see note 1), basal incision narrow with subparallel margins or a sharp angle between them, the leaves in and close under the inflorescence often with a larger angle or base subtruncate. Stamens 70–180, anthers hairy at apex or glabrous.

Distribution. Sumatra, Malaya (only Pahang and Tioman I.), Java, Lesser Sunda Islands, Borneo, Philippines, Celebes incl. Buton I., Moluccas, New Guinea, Bismarck Archipelago, Solomon I., New Hebrides (Erromanga), New Caledonia.

Habitat. In secondary and shrubby vegetations, in primary forest especially in clearings, along paths and in edges (but possibly also in closed forest?), on hillsides, roadsides, riversides, from sea-level up to c. 2000 m altitude, sometimes higher, highest records c. 2500 m and once 2900 m.

Vernacular names (as reported on herbarium labels). Kupi-kupi and variants, sunggirgir, irnga-irnga (all N. Sum.), pancaringit, pingat (both W. Sum.); hareu-eus (Java, Sundanese), larat or larap, berètè, grunggung (all Javanese); birus (Flores), rikkerara (Sumba), siol (Timor), alokai, da, dé (all Alor); emperingat (Borneo, Sarawak), litagoh, beris (both Sabah), asam-asam (Borneo, Malay), dili-dili-palian (Sabah, Murut), sirimit (Sabah, Idahan), langamit (Sabah, Kedayan); sapinit and variants, katupi (both Mindanao); bukiri (S. Cel.), komea (Buton); sisoja (Seram); tarbali (Aru I.); karpa (New Guinea, W. Sepik), iki-limbu (New Guinea, West. Highl.), kindigambukl (New Guinea, East. Highl.), mamanani (New Guinea, South. Highl.); si-imu, hebere higo (both Solomon I.).

SUMATRA. Aceh. Mt Mamas, de Wilde c.s. 15822. — North. Bandarbaru, Lörzing 4742; Mt Sibayak, Lörzing 13503; Asahan, Bartlett & La Rue 219, Rahmat si Boeea 1356; road Pematangsiantar—Berastagi, Bangham 953; road Porsea—Prapat, Rahmat si Boeea 10847; Sidikalang,

Alston 14797; Toba plain near Siborongborong, Huitema 17. – West. Lubuksikaping, van Borssum Waalkes 1833; Payakumbuh, Alston 13807; Mt Singgalang, Beccari 136, Bunnemeijer 2686; Mt Merapi, Bunnemeijer 4835; Mt Malintang, Korthals 363a; Mt Talang, Bunnemeijer 5166; Mt Kerinci, Bunnemeijer 9787, 10006, Meijer 6480, Robinson & Kloss 50. – Jambi. Kerinci, Morley & Kardin 251. – Bangka. Lepar I., Bunnemeijer 2438. – Belitung (Billiton). No locality, Vorderman 203.

MALAYA. Pahang. Cameron's Highlands, different localities, several collections; Genting Highlands, Gunong Ulu Kali, Siew 212, 277, Stone 14068. – Tioman I. Henderson 18257, Kadim & Noor 605, Nur 18794.

JAVA. West. (A selection of the many specimens.) Mt Pulasari, Adelbert 431; Mt Karang, Koorders 41713; dist. Lebak, different localities, Backer 1127, 1915, Buwalda 2881; Depok nature reserve, several collections; Bogor and vicinity, several collections; Mts Gede–Pangrango, several collections; Cibeder and vicinity, several collections; Mt Kancana, Backer 1235, Koorders 41021, 42677; Ciandjur, Backer 23696; Takoka, Koorders 15197; Pelabuhanratu, Koorders 34409; Mt Patuha, Scheffer 19974; Mt Papandayan, Koorders 48016; island in Lake Penjalu, Koorders 47642; Kalipucang, Scheffer s.n. (133). – Central. Between Purwokerto and Batraden, Backer 126; Subah, Koorders 23289; Mt Perahu, Backer 21820, Horsfield s.n.; Dieng Mts, Lake Dringu, van Steenis 4590; Mt Telomoyo, Koorders 35981; Mt Merbabu, Büsgen 162; Mt Merapi, Junghuhn s.n.; Mt Kuria, Kern 8587. – East. Mt Lawu, Dorgelo 3353; Mt Wilis, Dorowati, Kuntze 5907, Posthumus 1862; between Sripit and Prigi, Lörzing 997; Mt Kelud, Clason K 126, K 164, Coert 17, van der Veen 29; Mt Arjuno, Koorders 43741; Tengger Mts, Buysman 137, Dorgelo 47; Mt Lamongan, Jeswiet s.n.; Ijen Mts, Koorders 29358.

LESSER SUNDA ISLANDS. Lombok. Elbert 1398. – Sumbawa. Elbert 4170, Kostermans 18061. – Flores. Schmutz 194, 1106, 2721, Veldkamp 7008. – Sumba. Grevenstuck 52, Iboet 410, Teijsmann 51, Verheijen 4066. – Timor. Forbes 3610, Friedberg 541. – Alor. Jaag 176, 292, 1454. – Wetar. Elbert 4614, 4639. – Damar. Riedel s.n.

BORNEO. Sarawak. Kuching, Brooke 9427, Purseglove & Shah 4378 (mixed coll.), Saheb s.n.; Bau, Brooke 9829, 10835; Poi, Native coll. 5031; Upper Rajang river, Clemens 21623 (mixed coll.); Kapit Dist., Bukit Tibang, Anderson S 28386; Baram Dist., Tutoh, Anderson 4056; Bukit Mersing, Purseglove 5263, Sibatak Luang S 22362; Punan Busang, Geh & Samsuri 203; Sadong, Native coll. 5018; Matang, Haviland c.c.b.g.; Bakelalan, Brooke 10562. – Sabah. Ranau Dist. Tenompok, Kadir A 1645; Ranau, Darnton 121; Lakang, Mujin SAN 18824; Mt Kinabalu, Chew c.s. 1287, 2627, Clemens 33878; Marudu Bay, Fraser 250; Sandakan Dist., Telupid, Aban & Saikh SAN 79314; Lahad Datu Dist., Silam, Talip SAN 52863; Lahad Datu, Kamis 3010; Bole river, Puasa 3140. – Indonesian Borneo. East. Kutai Dist., Kemul, Endert 4412; Mt Tuliang, Rutten 448; Sungai Bungalun, Rutten 536.

PHILIPPINES. Luzon. Cagayan Prov.: Sitio, Bartlett 14943. – Isabela Prov.: Sierra Madre Mts, Gutierrez PNH 78060, 78197; Mt Cresta, Ramos BS 76985. – Mountain Prov.: Mt Pulog, Steiner 2044; Crystal Cove, Steiner PNH 35833; Sablang, Fénix BS 12571. – Nueva Vizcaya Prov.: Dupax, Merrill 221. – Nueva Ecija Prov.: Mt Caraballo Sur, Vidal 2703. – Quezon Prov.: Lucban, Elmer 9119; Mt Binuang, Ramos & Edaña BS 28777; Siniloan Trail, Robinson BS 9493. – Laguna Prov.: San Antonio, Ramos BS 20431; no loc., McGregor BS 22777. – Catanduanes. Casalugar river, Ramos & Edaña BS 75571. – Samar. Loquilocon, Sulit PNH 6102; Schopton, San Carlos Univ. 394; Balangiga, Madulid c.s. PNH 118143, 118463; Borongan, Castro PNH 5786. – Panay. Capiz Prov., Edaña BS 46152, Ramos & Edaña BS 31004 (mixed coll.). – Negros. Dumaguete, Herre 1116. – Cebu. Villamor PNH 92002. – Leyte. Mt Mamban, Edaña PNH 12102; Biliran I., Mt Suiro, Sulit PNH 21492; no loc., Wenzel 575. – Bohol. Ramos BS 42639. – Sulu I. Jolo, Ramos & Edaña BS 44444, Williams 3105; no loc., Kondo & Edaña PNH 38848. – Mindanao. Zamboanga Prov.: Mt Tubuan, Ramos & Edaña BS 36667; no loc., Merrill 8230; St. Cruz I., Sapamoro, Olsen & Hansen 907. – Lanao Prov.: Gubang and Mupo Mts, Eballo 1078. – Bukidnon Prov.: Tangkulan, Ramos & Edaña BS 39034. – Davao Prov.: Mt Apo, Edaña PNH 1389; Mt Mayo, Edaña PNH 11347; Mt Mansmuga, Edaña PNH 11102; Mt Dagatpan, Warburg 14482. – Cotabato Prov.: Parang, Edaña PNH 1516.

CELEBES. North. Minahasa, Alston 15687, 15802, Forsten s.n., Koorders 18565, 18571, 18572, Riedel 5704; Gurupahi, Kaudern 26. — Central. Pinapuan, Kaudern 419. — South. Mt Tabarane, Rachmat 473; Gandang-Gandang, Rachmat 413; Mt Padang Kajang, Rachmat 827; Lombasang, Bünnemeijer 11451; Mt Lompobatang (Bonhain), Bünnemeijer 11604, 12018; Mt Galesong, Bünnemeijer 10815. — Buton I. Air Jatuh nature reserve, Widjaja 570.

MOLUCCAS. Sula I. Mangole I., Wukapao, van Hulstijn 48. — Seram. Toluarang river, Kornassi 85; Manusela, Eyma 1970; Riring, Rutten 1732; Melilia, Rutten 1641. — Ambon. Latua, Boerlage 397; Batu Gaja, Boerlage 7; without loc., Doleschall 51.

NEW GUINEA. Irian Jaya. Vogelkop Peninsula: Ayamaru, Brongersma 35; Aifat river, van Royen & Sleumer 6866, 7025; Arfak Mts, Mt Lekuma, Mayr 143. — Biak I.: Soreda, Britton 45; N. coast, Feuilletau de Bruyn 324; Bosnik, Feuilletau de Bruyn 382. — Yapen I.: Serui, Aet & Idjan 430. — North: Nabire, Kanehira & Hatusima 11744; Doorman river, Lam 1293. — Jayapura: Polimac, Koster BW 1174; Ifar, McKee 1864. — Snow Mts: Lorentz river, Pulle 500; Nassau Mts, Exploratie biv., Docters van Leeuwen 10531, 10665; Mt Carstensz (= Jaya), Kloss s.n., several collections. — Aru I.: Wokam I., Buwalda 4876. — Papua New Guinea. West Sepik Prov.: Lumi Subprov., Kaiye, Darbyshire & Hoogland 8097. — Madang Prov.: Kelel, Schlechter 16193. — Morobe Prov.: Huon Penins., Pindiu, Hoogland 8979; Zenag, Hartley 10940; Wareo, Clemens 1428; Wau-Salamaua road, Womersley & Millar NGF 8740. — Western Highl. Prov.: Wabag, Flenley 2070. — Eastern Highl. Prov.: Goroka Subprov., Daulo, Pullen 392. — Southern Highl. Prov.: Tari Subprov., Telabo, Powell UPNG 1624; Mt Ialibu, Coode c.s. NGF 40295. — Gulf Prov.: Kerema, Brass 1222. — Central Prov.: Subitana, Womersley & van Royen NGF 5811; Musgrave river, Gebo UPNG 401; Dieni, Brass 3927; Lake Myola, Gillison 376; Mt Scratchley, Giulianetti (MacGregor) s.n. — Milne Bay Prov.: Baniara Subprov., Nowata, Kanis 1113; Mt Dayman, Brass 22372; Nawandowan river, Cruttwell 1366.

BISMARCK ARCHIPELAGO. Admiralty I. Manus I., Mt Dremse, Foreman & Katik LAE 59122. — New Ireland. Kaut Harbour, Coode & Katik NGF 29833. — New Britain. Talasea Subprov., Mt Penck, Croft & Vinas NGF 41356; Hoskins Subprov., Nantambu, Isles & Vinas NGF 32339; Kandrian Subprov., Unai river, Sayers NGF 21853; Gasmata Subprov., Torlu river, Sayers NGF 24221.

SOLOMON ISLANDS. Bougainville. Siwai, Waterhouse 85B; Kieta, Kajewski 1589; N. of Buin, Craven & Schodde 31, 324. — New Georgia. Waterhouse 96. — Guadalcanal. Mt Tutuve, Kajewski 2673; Gold Ridge, Walker & White BSIP 57; Beti Beti, Runikera c.s. BSIP 10016.

Notes. 1. The longer leaves with a leaf-index of more than 1.5 are found especially in Sumatra and Malaya (up to 2.0), and in New Guinea (even up to 2.5).

2. Two specimens from Mt Pangrango on Java (*Schiffner 2019* and *van Steenis 17620*) have peculiar gland-bearing bristles on twigs, petioles, undersurface of leaves, pedicels and the outside of the calyx.

3. Two specimens from New Guinea (*van Royen & Sleumer 6866, 7025*, collected close together in Vogelkop Peninsula) have leaves without closed felt below, but with some short, curly hairs. They constitute Van Royen's forma *glabra* (in his var. *thespesiaephyllus*). Although the indument is more like *R. glomeratus* than *R. moluccanus*, the plants look more like the latter. The real value of this deviation and its name cannot yet be judged.

4. The fruits are mostly reported as edible but tasteless. The water from the stems is applied for eye diseases (Java, *Kuhl & van Hasselt*), the water from the leaf is applied to the eyes of young mothers (Borneo, *Winckel 1013*). Young twig ends are eaten raw as vegetable (Java, *Bakhuizen van den Brink 8168*).

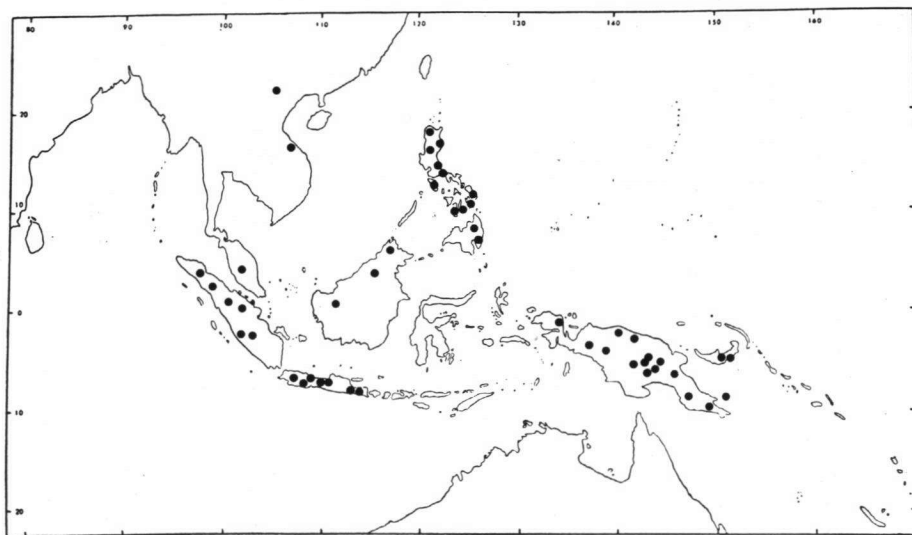


Fig. 3. Distribution of *Rubus moluccanus* var. *obtusangulus*.

c. var. *obtusangulus* Miquel

R. moluccanus L. var. *obtusangulus* Miq., Fl. Ind. Bat. I, 1 (1855) 383, '*obtusangula*'.

R. moluccanus L.: sensu Kuntze (1879) p.p.; sensu Koorders (1912) p.p. (2 out of 4 specimens cited); sensu Merrill (1923) p.p.

R. pseudotiliaceus Kuntze forma *parvifolia* Kuntze (1879).

R. moluccanus L. var. *hasskarlii* (Miq.) Backer (1911) p.p.; Backer & Bakh. f. (1964) p.p.

R. indiscissus auct. non Focke; sensu Thuan (1968) as far as Continental specimens are concerned.

R. hasskarlii auct. non Miquel: Thuan (1968 & 1970).

R. integrifolius Ridley (1916).

R. ochraceus Cardot (1917).

R. hasskarlii Miquel subsp. *dendrocharis* Focke (1910) p.p.?. – *R. dendrocharis* (Focke) Focke (1916). – *R. moluccanus* L. var. *dendrocharis* (Focke) van Royen (1969) p.p.

For complete references, see under the species.

Young twigs and nerves and veins on the lower leaf surface with appressed (sometimes semi-appressed), long, straight hairs (apart from the underlying cover of thin, curly hairs), the straight hairs sometimes only sparsely present. Leaves shallowly 3–5-lobed to hardly lobed at all, length/width (1.1–)1.3–1.7(–1.9), base subtruncate to shallowly cordate with an obtuse angle between the margins. Stamens 30–140, anthers nearly always hairy on top, in Sumatra always glabrous.

Distribution. Vietnam, Sumatra, Malaya, Java, Borneo, Philippines, New Guinea, New Britain. See note 2 and figure 3.

Habitat. Forest edges, secondary and depleted forest, thickets, along roads, trails and streams, mostly collected between 900 and 2000 m altitude, sometimes as

low as 150 m, especially in New Guinea also at higher altitudes, up to 2450 m, from Java two collections from resp. 2600 and 3000 m.

Vernacular names (as reported on herbarium labels). Brembet and variants (Javanese), baremis (W. Java); penet an pagol, kobot (both Luzon), dubao (Samar), sampignit (Mindanao); kerikna (W. New Guinea, Eipomek), omonom (New Guinea, W. Sepik), jiglimp, kumbugan (both New Guinea, W. Highl.), kaberau (New Guinea, E. Highl.), igumbat (New Guinea, S. Highl.); harakao (Guadalcanal).

SUMATRA. Aceh. Mt Leuser, de Wilde c.s. 12287, 13614; Gayo lands, van Steenis 9442. — North. Karo plain, Kerling s.n., Rahmat si Toroes 402; Asahan, Lumban Ria, Rahmat si Boeea 7883. — West. Mt Sago (= Malintang), Meijer 5338; Limapuluh Kota, Bünnemeijer 3446. — Jambi Prov. Siulakderas, Robinson & Kloss s.n. — Bengkulu Prov. Seminung, Rappard S 26 (mixed coll.). — South. Mt Raya, van Steenis 3591.

MALAYA. Pahang. Cameron's Highlands, Brinchang, Poore 86.

JAVA. West. Mt Salak, Kuntze 4825; Takoka, Koorders 15076; Cibeber, Bakhuizen van den Brink 1801; Mt Papandayan, Visser A 70203; Mt Ciremay, Backer 4809. — Central. Mt Slamet, Backer 517, Murata c.s. J 676; Dieng Mts, Junghuhn s.n., Kartawinata 1240, Veldkamp 6013; Pringombo, Koorders 34035; Telemoyo, Koorders 35980. — East. Tengger Mts, Kobus s.n.; Iyang Mts, Geerts-Ronner s.n., Hoogerwerf 452.

BORNEO. Sarawak. Mt Api, Chai S 30387. — Sabah. Mt Kinabalu area, several specimens from different localities; Banguay, Fraser 219. — Indonesian Borneo. West. Bidang Menabei, Winkler 1081.

PHILIPPINES. Luzon. Ilocos Norte Prov.: Mt Darna, Edaño 18070. — Isabela Prov.: Mt Moises, Ramos & Edaño BS 47324. — Mountain Prov.: Baguio, Elmer 8517, 5987, Madulid & Hamoy PNH 108657, Mendoza PNH 81881; Mt Polis, Pancho PNH 34706; Ifugao, Conklin & Buwaya PNH 80574. — Nueva Ecija Prov.: Mt S. Caraballo, Vidal 2071. — Rizal Prov.: Castilla, Loher 5975; Montalban, Loher 5984. — Sierra Madre Mts: Dingalan, Jacobs 7862. — Mindoro. Mt Kinawiran, Conklin PNH 17528. — Samar. Mt Concord, Gutierrez c.s. PNH 117127. — Negros. Mt Canlaon, Edaño PNH 21931; Mt Silay, Whitford 1507; Mt Malbug, Edaño PNH 7122. — Leyte. Mt Abucayan, Edaño BS 41793. — Bohol. Cuming 1837. — Mindanao. Agusan Prov.: Mt Urdaneta, Elmer 13763. — Davao Prov.: Santa Cruz, Williams 3038; Mt McKinley, Edaño PNH 1062. — Dansalan–Raman road, Zwickey 84.

NEW GUINEA. Irian Jaya. Vogelkop Peninsula: Nettoti Range, van Royen & Sleumer 8090; Arfak Mts, Gibbs 5976, Kostermans 2240, Vink BW 11444. — North: Cycloop Mts, van Royen 3771. — Snow Mts: Mt Jaya (Carstensz), Kloss s.n., Raynal 17623; Eipomek Valley, Hiepko & Schultze-Motel 1075; Lake Habbema, Brass 11376, 11496. — Papua New Guinea. West Sepik Prov.: Torricelli Mts, Darbyshire 340; Star Mts, Veldkamp 6712, Vinas & Wiakabu LAE 59487. — Morobe Prov.: Wau, van Royen 4359; Wantoat, Womersley & Thorne NGF 12650. — Western Highl. Prov.: Lagaip Valley, Hoogland & Schodde 7383; Kubor Range, Vink 16393. — Chimbu Prov.: Mingende, Gilli 232. — Eastern Highl. Prov.: Mt Wilhelm, Brass 30587; Goroka Subprov., Streimann NGF 35733; Aiyura, McKee 1280. — Southern Highl. Prov.: Anga Valley, Schodde 1493; Ialibu, Womersley & Woolliams NGF 25000. — Central Prov.: Mt Tafa, Brass 4933; Wotape–Kosipi road, van Royan NGF 20284; Kerau Mission, Frodin & Hallpike UPNG 725; Astrolabe Range, Stevens LAE 50368. — Milne Bay Prov.: Mt Suckling (Goropu) area, Stevens & Veldkamp LAE 54030, Streimann NGF 34081, Veldkamp & Stevens 5908. — D'Entrecasteaux I.: Goodenough I., Brass 24745.

BISMARCK ARCHIPELAGO. New Britain. Hoskins Subprov., Stevens LAE 58499; Pomio Subprov., Stevens & Lelean LAE 58208.

Notes. 1. The recognition of the varieties *discolor* and *obtusangulus* does usually not present a problem, if the specimen possesses a number of leaves below the in-

florescence. If only the inflorescence is present, identification is not possible since the raceme-bearing leaves of var. *discolor* are often subtruncate at base.

2. This variety is distinctly more rare than the foregoing two. Moreover it is absent from a substantial part of the Malesian area (fig. 3). The variety may be more sensitive to seasonal drought than varieties *moluccanus* and *discolor*, but this cannot be the entire explanation.

3. The fruits are edible. Stems are used as binding material (Philippines, *Conklin & Buwaya PNH 80574*).

d. var. *angulosus* Kalkman, var. nov.

R. moluccanus L. sensu stricto, sensu Kuntze (1879).

R. moluccanus L. sensu Merrill (1923) p.p.; sensu Thuan (1968 & 1970) p.p.

R. angulosus Focke (1910) non Gremler (1871); Koorders (1912); Ridley (1922).

For complete references, see under the species.

Differt a varietatibus ceteris foliorum partibus basalibus sese partim tegentibus.

T y p u s : *Kurz (Amann) s.n.* from Bangka, in L, sheet nr. 905.130-24, iso in U. This may not be the best specimen available but it seemed wise to select a specimen identified by Focke as his *R. angulosus*. See also the synonymy of the species.

Young twigs and nerves and veins on the lower leaf surface with semi-appressed to patent, long, straight hairs (apart from the underlying cover of thin, curly hairs). Leaves distinctly 3–5(–7)-lobed with the main lobes usually shallowly lobed again, apical lobe large (half of the total leaf length or slightly smaller), length/width (1.1–)

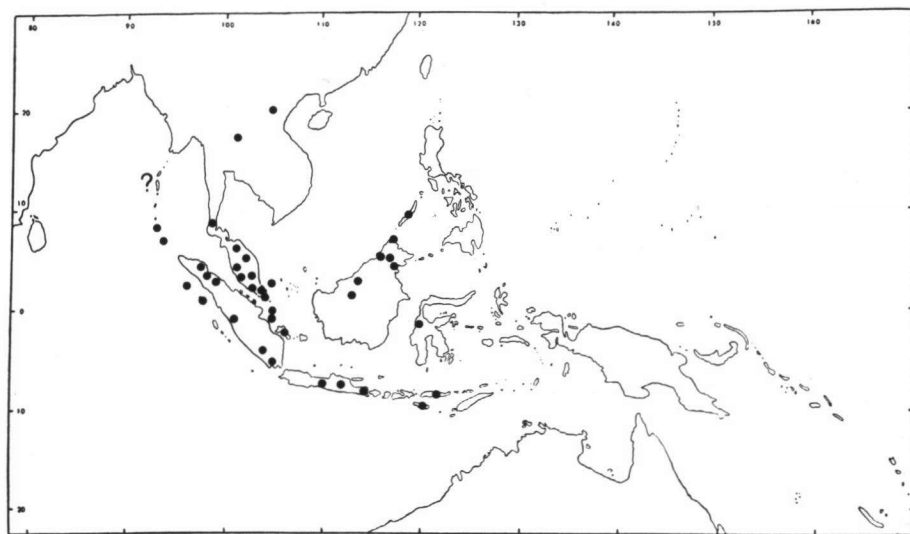


Fig. 4. Distribution of *Rubus moluccanus* var. *angulosus*.

1.2–1.3(–1.4), base cordate, the margins of the basal lobes distinctly overlapping or at least touching each other. Stamens (85–)100–185, anthers hairy on apex.

Distribution. Thailand, Vietnam, ? Andaman I., Nicobar I., Sumatra and islands near it, Malaya, Singapore, Java, Lesser Sunda Islands, Borneo, Palawan, Celebes. See note 2 and figure 4.

Habitat. In forest edges, secondary forest and thickets, also near the beach and on riverbanks, from sea-level up to c. 500(–1000) m altitude, the few specimens from Java from higher altitude, see note 1.

Vernacular names (as reported on herbarium labels). Ifatu (Simeuluë); kepia ajam (Sum., Malay); akar tumpu ranau (Mal., Malay); gerunggung bini (E. Java); lolo tara werri (Sumba); lintagu and variants, terong pasai (both Sabah); duri puntiana (Cel., Malay).

INDIA. Nicobar I. Katchal I., Chakraborty 3104; Great Nicobar I., Balakrishnan 2961, 3977.

SUMATRA. Simeuluë I. (= Simaloer). Achmad 423. – Nias I. von Römer s.n. – Aceh. Mt Kuta Bulur, N. of Trumon, Asdat 142. – North. Labuhan Batu, S. of Rantauprapat, Rahmat si Toroes 4219, 4273; Sibolangit–Bukit Kluang, Nur SFN 7420; no loc., Yates 1262. – West. Above Telug Kabung, van Borssum Waalkes 1485; Padang, Leefmans 51; no loc., Diepenhorst 19977. – South. N. of Lake Ranau, van Steenis 3354. – Lampung. Kotajawa, Forbes 1398. – Riau Arch. Papan I., Bünnemeijer 7793; Buru I., Ridley s.n. – Lingga Arch. Singkep I., Bünnemeijer 7280. – Bangka I. Garut, Ruloffs 5737; no loc., Kobus s.n., Kurz (Amann) s.n.

MALAYA. Perak. Relau Tagok, Wray 1910. – Kelantan. Kuala Krai, Haniff & Nur 10137; Kuala Lebir, Ridley s.n.; Kuala Lekor, Ridley s.n. – Pahang. Temerloh, Ridley 2601; Bukit Chuas, Henderson SFN 25203; Sungai estates, Kadim & Mahmood 56. – Tioman I. Joara Bay, Burkill s.n. – Selangor. Kuala Lumpur, several collections; Kepong, Kochummen KEP 98173. – Malacca. No loc., Alvins 375, Griffith s.n., Maingay 1210. – Johore. Datok Sawah, Hardial Singh & Samsuri HS 1002; Kota Tinggi, Maxwell 77-338.

SINGAPORE. Bukit Timah, Hardial 641; Chan Chu Kang, Ridley s.n.: Holland Road, Burkill 290; Tanglin, Ridley s.n.; no loc., Cuming 2421, Debeaux s.n., Ridley s.n., Schomburgk 95, Thomson s.n.

JAVA. Central. Subah, Koorders 23420. – East. Mt Wilis, Dorowati, Kuntze 5870; Ijen Mts, Koorders 15402, 32277.

LESSER SUNDA ISLANDS. Sumba. Metzner 186. – Flores. Schmutz 1434.

BORNEO. Sarawak. Belarga, Brooke 9114; Bukit Buan, Purseglove P 5475; Upper Rejang river, Native coll. 5271, Clemens 21122. – Sabah. Banguay I, Castro & Melegrito 1667; Beaufort, Kabul 5467; Tawao, Elmer 21189; Pandasan, Darnton 2; Malamam, Lumau 2612; Batu Puteh, Burut 2917; Jesselton, Clemens 9643; Tanom to Malalap, Gibbs 2856; Bras Manik, Maidin 1604; Mostyn Dist., Kelumpang, Sinanggul 54650. – Indonesian Borneo. West. Bukit Lempai, Teysmann 8496.

PHILIPPINES. Palawan. Panalingajan river, Edaño BS 77431.

CELEBES. South. Pasang kaju, Rachmat (van Vuuren) 184.

Notes. 1. The few specimens from Java can nowhere else be inserted but they are from higher altitudes (1100–1450 m, three records) than the rest of the material which was usually collected below 500 m (one record, from Flores, 900–1000 m).

2. Focke cited the taxon from the Andamans which is quite plausible although I saw no specimens. The variety may also occur in Laos (Thuan, 1968). According to Focke the variety possibly ('anscheinend') also occurs in Luzon but I did not see any

material of that island. His record may have been based on *Cuming 2421* from Singapore of which at least some duplicates were mislabelled 'Philippines'.

A specimen in NY, collected by the Wilkes U.S. Expl. Exp., bears the annotation Borneo but since the expedition did not collect on Borneo itself, it seems plausible that the specimen originates from the Mangsi Islands between Palawan and Borneo.

3. The fruits are edible. Boiled roots are a medicine against dysentery (Malaya, *Alvins 375*).

15. *Rubus keleiterios* van Royen

R. keleiterios van Royen, Phan. Monogr. 2 (1969) 87, f. 22. – Type: *Hoogland & Pullen 6226*, holo in L, iso seen in K.

Shrub ? (no field data). *Stems* densely hairy with thin, curly hairs and thicker, straight, appressed to semi-appressed, long hairs and with few short ($-1\frac{1}{2}$ mm) prickles. *Leaves* simple. *Stipules* rather persistent, 14–17 by 2 mm with 2 or 3 narrow, up to 5 mm long lobes, densely hairy outside, glabrous inside. *Petioles* $1\frac{1}{2}$ – $2\frac{1}{2}$ cm, densely hairy like the twigs, with few prickles. *Leafblades* broadly ovate in outline, distinctly 3-lobed, length/width 1.0–1.5, $5-7\frac{1}{2}$ by $5-6\frac{1}{2}$ cm; base cordate, the incision $\frac{1}{2}$ –1 cm deep, the basal angle mostly sharp or \pm right, margin unevenly serrate with 5–7 teeth per cm, apex acute; firmly herbaceous; nervation palmate with 5 main nerves, each with c. 4 pairs of primary laterals, nerves terminating in the margin, venation reticulate, nerves and veins slightly impressed above, rather prominent below; upper surface rather densely villose, lower surface with a dense woolly felt of short, curly, thin hairs and with many thicker, straight, appressed to semi-appressed, long hairs; leaves *in sicco* dark brown to dark olive above, yellow brown below, distinctly two-coloured. *Inflorescence* terminal (only one well-developed specimen seen), a leafy thyrsus consisting of c. 8 dichasial to monochasial laterals of which the lower 5 in the axils of leaves, the upper ones bracteate; dichasia with up to 5 flowers, the entire inflorescence c. 15 cm long, the dichasia c. 4 cm; axes of the inflorescence densely hairy like the twigs and with few prickles; *pedicels* up to $1\frac{1}{2}$ cm long, densely hairy; *bracts* c. 10 mm long, deeply incised, the up to 8 lobes up to 4 by $\frac{1}{2}$ mm, densely hairy outside, glabrous inside; bracteoles 2, in the middle of the pedicel, like the bracts but smaller, up to 7 mm long, persistent as are the bracts. *Flowers* bisexual, flowerbuds ovoid. *Hypanthium* cup-shaped, 7 mm across, 1 mm high, densely short-woolly and with appressed long hairs outside, glabrous inside except around the torus. *Sepals* spreading during anthesis, triangular, the outer ones with up to 3 teeth on each of the uncovered margins, teeth up to 1 mm long, inner ones entire, sometimes all sepals entire, $6\frac{1}{2}$ –8 by $2\frac{1}{2}$ –4 mm, outer ones wider than inner ones, outside on uncovered parts hairy as outside hypanthium, the covered margins only woolly, inside silky hairy. *Petals* erect, persistent, \pm orbicular on a distinct, rather long (1 mm or slightly longer) claw, $5\frac{1}{2}$ –7 by 3–5 mm, long-hairy outside, white. *Stamens* 85–125, glabrous; filaments up to 5 mm; anthers dorsifixed, c. $\frac{1}{2}$ mm long. *Pistils* c. 60;

ovaries 1 mm long, sometimes glabrous, sometimes with few hairs on top which easily escape attention (see note 2); styles up to 6 mm long. *Torus* elevated, densely hairy. *Collective fruit* globular, c. 1 cm diam., sepals closing after anthesis; fruits c. 4 mm long when dried; exocarp thick and leathery, probably thick and juicy when living, glabrous or with many long, curly hairs on backside in upper half; endocarp rugose, stone c. $2\frac{1}{2}$ by $1\frac{1}{2}$ mm.

Distribution. New Guinea.

Habitat. Once in shrubbery, once in grass-swamp, 1700–1950 m altitude.

NEW GUINEA. Papua New Guinea. Western Highl. Prov.: Mount Hagen station, Hoogland & Pullen 6226. — Eastern Highl. Prov.: Zokizoi river NW. of Goroka, Gilli 93.

Notes. 1. The two collections belonging to this species have a distinctive leaf-shape: very broad and short ($l/w \pm 1$) and with a relatively large end-lobe of about half of the total leaf-length. The leaf description of *R. keleterios*, however, falls within the overall range of *R. moluccanus* L. and it could be argued that it is better considered to be a fifth variety of that large species. The combination of the characteristic leaves with the characters of the inflorescence (long pedicels with persistent bracteoles) make it possible to recognize *keleterios* and in view of the difficulty to compare two taxa of which one is known from hundreds, the other from only two specimens, I decided to maintain *R. keleterios* as a species. When it becomes better known, *R. hillii* F.v.Muell. from Australia must also be compared since it has a similar leaf-shape.

2. This is the only species of the subgenus in New Guinea in which hairy fruits have been observed. There is, however, the remarkable fact that in two of the four twigs in Gilli 93 the fruits are glabrous. See also the note on *Rubus spec. (1)* under the incompletely known species (p. 381).

3. The species must be extremely rare with only two collections from the well-covered New Guinean highlands.

16. *Rubus alceifolius* Poiret

R. alceifolius Poir. in Lam., Encycl. Méth. 6 (1806) 247, '*alcaefolius*', in obs. '*alceaefolius*' as with many other authors; Seringe in DC., Prod. 2 (1825) 567; Bl., Bijdr. 17 (1827) 1109, excl. loc. Moluccas; Hassk., Flora 27 (1844) 586; Miq., Fl. Ind. Bat. I, 1 (1855) 379; Suppl. I (1860) 116, 308, excl. loc. Bangka; Kuntze, Meth. Speciesbeschr. (1879) 56; Focke, Bibl. Bot. 72 (1910) 78, f. 29, prob. incl. var. *emigratus* Focke, nomen prov., see note 3; Backer, Schoofl. Java (1911) 457; Koord., Exk. Fl. Java 2 (1912) 323; Cardot in Lec., Fl. Gén. Indochine 2 (1920) 635; Ridl., Fl. Mal. Penins. 1 (1922) 677; Merr., Contr. Arn. Arbor. 8 (1934) 68; Hochr., Candollea 4 (1936) 63, var. *genuinus*; Backer & Bakh. f., Fl. Java 1 (1964) 516; Thuan, Fl. Camb., Laos & Vietn. 7 (1968) 49; Fl. Thail. 2 (1970) 55; Iconogr. Corm. Sin. 2 (1972) 265; Kleinschmidt & Johnson, Weeds of Queensl. (1977) 189. — *R. moluccanus* L. var. *alceifolius* (Poir.) Kuntze, Rev. Gen. Pl. 1 (1891) 222; King, J. As. Soc. Beng. 66, ii (1897) 295. — Type: *Commerson* specimen, collected in Java, holo in P-JU.

R. roridus Lindley in Edw., Bot. Reg. 19 (1833) pl. 1607. — Type: probably a living plant, originated from Madagascar, growing in Lambert's garden at Boyton, from which the drawing was made. If a specimen has been saved, possibly in CGE.

R. pinnatisepalus Hemsl., J. Linn. Soc., Bot. 29 (1892) 305; Li, J. Arn. Arbor. 25 (1944) 421; Woody Fl. Taiwan (1963) 307, f. 110; Liu & Su, Fl. Taiwan 3 (1977) 121, f. 495. – Type: *Faber 505* from Mt Omei, not seen.

R. laciniatostipulatus Hayata ex Koidzumi, J. Coll. Sci. Univ. Tokyo 34, 2 (1913) 154. – Type: according to Li it is *Nakahara 207* in TO, not seen.

Shrub with arching or climbing branches up to 5 m long. Twigs rather densely covered with more or less patent straight hairs, mixed with shorter thinner hairs and with few to many stalked glands especially in the younger parts, the glandular hairs soon losing their heads (see note 2); prickles usually rather many, stout, up to 6 mm long, recurved, hairy at the broad base. Leaves simple. *Stipules* often rather persistent, leaving a distinct horizontal scar, \pm orbicular in outline, up to c. 2 cm long, deeply digitately divided with the lobes pinnate, most elaborately so on the side of the petiole, sometimes only pinnately divided, the lobes very narrow, thread-like, at most $\frac{1}{3}$ mm wide, outer surface and margins patently hairy and with shorter hairs, sometimes also few stalked glands present, inside glabrous. *Petioles* 3–11 cm long, indumentum as on the twigs, with some prickles, more distinctly recurved than on the twigs. *Leafblades* \pm orbicular to broadly ovate in outline, length/width 0.9–1.1, (10–)12–26 by (9–)12–26 cm, 5–7-lobed, the incisions up to 4 cm deep, lobes rounded and shallowly lobed again; base cordate with the basal incision up to 6 cm deep, with an angle of less than 90° , margins rather grossly and evenly serrate with 4–7 teeth per cm, apex obtuse to acute; herbaceous to slightly coriaceous; nervation pectate, with on each side at the very base of the midrib 2 or 3 main side nerves, each having 3–4 basicopic lateral nerves, on the midrib 3–4 pairs of lateral nerves above the basal ones, nerves terminating in the margin, venation reticulate, nerves and veins prominent below, impressed above and sometimes the upper surface distinctly bulate; upper surface \pm patently hairy, densely on the nerves and veins, sparsely between the smaller veins, lower surface with a usually closed, sometimes less dense felt of short, thin, curly hairs and with on nerves and veins many patent, long and soft hairs, on midrib and large nerves some curved prickles up to 3 mm; usually distinctly two-coloured when dry, darkbrown above, yellowish to greenish brown below, few data on colour *in vivo*, possibly whitish or greyish hairy underneath. *Inflorescence* terminal, consisting of up to 4 (rarely up to 7) racemes in the axils of the distant upper leaves, the twig terminating in a compound raceme with up to 8 (–10) laterals in the axils of bracts, the entire inflorescence (measured from the lowermost fertile leaf) up to 40 or 50 cm, the part above the uppermost leaf up to 20 or 30 cm long and 3–8 (–14) cm wide, the axillary racemes 3–12 cm long, the bracteate racemes up to 5 (–10) cm long, all axes terminating in a flower, the lateral racemes with up to 8 flowers, only in the very profuse ones up to 15 flowers and with cymes instead of flowers, all inflorescence axes densely patently hairy, sometimes also some prickles; *pedicels* 1–1½ cm long, up to 2 cm under the terminal flower, densely patently hairy; *bracts* rather persistent, pinnatifid to pinnatipartite, with thin lobes, 1–2 cm long, bracteoles as bracts but 4–9 (–12) mm long, both shortly woolly and with long hairs outside, glabrous inside. *Flowers* bisexual; flowerbuds \pm globular. *Hypanthium* cupular, 6–9 mm across, 1½–3 mm high, densely woolly and with long patent hairs

outside, inside glabrous except a ring of hairs around the torus. *Sepals* erect to apically recurved during anthesis, ovate with acute to acuminate apex, 6–10 by 4–7 mm, outer ones on the not-covered margins with 2–5 teeth of up to 2(–4) mm long, inner ones entire, outside shortly woolly and the uncovered parts also with long patent hairs, inside shortly woolly. *Petals* \pm orbicular, $5\frac{1}{2}$ – $9\frac{1}{2}$ by $4\frac{1}{2}$ –9 mm, shorter than the sepals or equaling them, early falling, usually distinctly clawed (c. 1 mm), apex rounded and sometimes notched, white, sometimes hairy outside and/or on margins. *Stamens* 160–230; filaments erect, up to 5 mm, glabrous; anthers $\frac{1}{2}$ – $\frac{3}{4}$ mm long, incised at base, less deeply so at apex, dorso-versatile, latero-introrse, with some to many long hairs on the connective, the top of the thecae and (rarely) on the margins of the valves. *Pistils* up to more than 150, glabrous; ovary 1– $1\frac{1}{2}$ mm long; style up to 10 mm long, exceeding the stamens. *Torus* elevated, glabrous or almost so. *Collective fruit* globular, c. 1 cm diam., sepals appressed around the developing fruits, flatly opening when ripe; fruits curved, 2–4 by 2–3 mm when dry; exocarp juicy, a thin, sometimes wing-like layer when dry, red; endocarp distinctly and deeply rugose, pyrene 2–3 by $1\frac{1}{2}$ –2 mm.

Distribution. China (Kweichow, Fukien, Kwangsi and Kwangtung according to Iconogr. Corm. Sin., also seen from Hunan), Taiwan, Burma, Thailand, Laos, Cambodia (according to Thuan), Vietnam, Sumatra, Malaya, Java, Lesser Sunda Islands, Borneo, Celebes. Introduced (?) in Australia (Queensland) and in Madagascar and Mascarenes. See note 3 and 4.

Habitat. In Malesia in light places like forest edges, roadsides, secondary forest, thickets and riversides, at altitudes from (0–)500 to 1400(–1600) m. According to Backer (34102) at the one sea-level locality brought down by the river. Since the species is not rarely growing near rivers, this may be a normal way of range-extension. Backer's note suggests that he did not believe that the species could grow permanently at this low altitude, without supply with new diaspores. Data from localities on the continent agree with the picture for Malesia.

Vernacular names (as reported on herbarium labels). Kupa-kupa, kupa (Sumatra, Karo, Alas); rebun pingat (Sumatra, Kerinci); daun tamparingat (Malay); hareueus with suffix badak or tegal (Java, Sundanese).

SUMATRA. Aceh. Gajo Lands, Fairchild 78, van Steenis 5887; Mt Leuser, de Wilde c.s. 13892, 15524; Alas valley, Lörzing 11150; Gumpang, Iwatsuki c.s. S 562, S 646. – North. Sibolangit, Lörzing 3900, 4738, 12446; Karo Highlands, different localities, Lesger 273, Lörzing 4921, 9032; localities around lake Toba, Bartlett 7409, van de Koppel 15, Lörzing 6581, 6619, Ouwehand 44, Roesel 337, Yates 1163; Asahan, Bartlett 7409, Bartlett & La Rue 109; Tapanuli, Habinsaran, Rahmat si Boeea 6104; Dolok Merangir, Bangham 609. – West. Lubuksikaping, van Borssum Waalkes 1847; Sungai Kuriman, Bunnemeijer 3289; Mt Singgalang, Schiffner 2021; Mt Marapi, Bunnemeijer 4834; Mt Siboga, Schiffner 2028; Mt Malintang (Sago), Bunnemeijer 3679; Padang, Junghuhn s.n.; Mt Kerinci, Bunnemeijer 7940, Robinson & Kloss 160. – J a m b i. Danau Kerinci, Bunnemeijer 8433. – South. Mt Dempo, Huitema 74; Blalauw, Forbes 1960.

MALAYA. Perak. Batang Padang valley, Wray 1463. – P a h a n g. Kuala Tembeling, Burkill & Haniff SFN 16062.

JAVA. West. Jakarta, Backer 34102; localities near Bogor, many collections; Mts Gede–Pangrango, several collections from different localities; Segaranten, Kuntze 5236; Cianjur, Backer 3047; Cibeber, Bakhuizen van den Brink 2591; Mt Tangkubanperahu, Backer 2405, Docters van

Leeuwen 11430; Mt Burangrang, Backer 14068; Lembang, Wisse 1167; localities near Bandung, Docters van Leeuwen s.n., Scholte 2348; Cicalengka, Wisse 843; Mt Papandayan, Scheffer 60; Mt Guntur, Ridley s.n.; localities near Garut, Backer 5455, Burck 95, Koorders 26685; Mt Ciremay, Backer 4888; Sukuraja, Backer 8501; Lake Panjalu, Koorders 47644, 47645. — Central. Mt Andong, Docters van Leeuwen 154; Mt Merbabu, Docters van Leeuwen s.n. — East. Mt Arjuna, Koorders 43712; Pujon, van Steenis 2556; Tengger Mts, van Harreveld 11, Hochreutiner 2764, Mousset 267; Iyang Mts, Backer 13147, Koorders 43602; Kalisat, Koorders 43057; Ijen Mts, Backer 25193.

LESSER SUNDA ISLANDS. Bali. de Voogd 2480 (doubtful). — Sumbawa. Rensch 695. — Flores. Schmutz 3786, Verheijen 3799.

BORNEO. Sabah. Labuan I., Burbidge s.n.

CELEBES. South. Enrekang Dist., Eyma 423, Kjellberg 1395. — Southeast. Sangona, Kjellberg 1118.

Notes. 1. Some authors reduced *R. alceifolius* to *R. moluccanus* L. and the two species undoubtedly have much in common. *Rubus alceifolius* differs, however, from all varieties and forms of the variable *R. moluccanus* in the shape of the closed flowerbuds (globular, not ovoid-pointed) and in the stipules which have very thin, filiform lobes. I did not see intermediates and consequently kept *alceifolius* as a species.

2. Variability in *R. alceifolius* is not very large. To be mentioned are two characters. The number of glandular hairs on young twigs and inflorescence axes is quite variable. From Madagascar *R. roridus* Lindl. was described with stipules and bracts 'covered over with numerous little transparent green glands, giving all the parts that surround the petals an appearance of being sprinkled with green dew' (Lindley, l.c.). Kuntze contrasted *R. alceifolius* and *R. roridus* by these glandular hairs: the former without, the latter with them. As far as I have seen, as well in Asia as in the Indian Ocean region the number of glands does not allow a sharp distinction and I consider *roridus* to be synonymous.

The dimensions of the leaves are in continental Asia averagely smaller than in Malesia, but the ranges overlap too much for an infraspecific distinction. About three quarters of the (c. 16) specimens from the continent that I could examine, have their leaves up to 10 by 10 cm and these could be distinguished from the Malesian group (see description). The remaining quarter, however, has larger leaves up to c. 17 by 18 cm.

3. In literature several wrong descriptions of the area can be found. Thuan mentions Japan which seems to be improbable. He also mentions the Philippines, possibly based on the wrongly labeled specimen *Cuming* 2421 which is from Singapore (*R. moluccanus* L.). Miquel mentioned Bangka on the basis of *Kurz* s.n. which belongs to *R. moluccanus* var. *angulosus*. It seems rather unbelievable that the species which has been found (be it a century ago) on Labuan near the coast of Sabah, should not occur on the mainland of Borneo.

4. I saw some specimens from Madagascar and the Mascarenes. According to Mr. Hoarao, St. Denis (in litt. April 1981) *R. alceifolius* is introduced on Réunion and becoming a noxious weed. Baker (Fl. Maur., 1877) mentioned *R. moluccanus* from Mauritius and this may refer to *alceifolius* which was cited from the island by Kuntze. Local botanists will have to decide upon the status of the species, whether native or

introduced. If introduced, the introduction must have been effected well before 1833 when *R. roridus* was described (see note 2).

The occurrence in Queensland is possibly also due to introduction. According to Kleinschmidt & Johnson (1977) it is known 'only from N. Queensland, on road shoulders and the edges of rain-forest', but they do not give an opinion about its being native or not. The species is not cited in the older flora's.

5. Although I did not see the type specimens of the two names described for Taiwan specimens, I am certain from the two collections I saw from that island, that these names are synonymous.

6. According to *van de Koppel 15* the shoots of this species are eaten (Sumatra), a use which is rarely mentioned for the species of *Rubus* in Malesia (see *R. moluccanus* L. var. *discolor*, note 3). According to *Burkill & Haniff SFN 16062* the roots of the species are boiled and taken against dysentery (Malaya). The collectors rarely comment on the palatability of the fruits, *Bangham 609* mentions that they are sweet.

7. The description given was drawn from the Malesian specimens only. See note 2 on the leaf dimensions.

17. *Rubus rolfei* Vidal

R. rolfei Vidal y Soler, Phan. Cuming. (1885) 171; Rev. Pl. Vasc. Filip. (1886) 122; Focke, Bibl. Bot. 72 (1910) 101, f. 43; Elmer, Leaflet. Philip. Bot. 2 (1908) 454; Hayata, J. Coll. Sci. Univ. Tokyo 25, art. 19 (1908) 81, incl. var. *lanatus* Hayata; Merr., Enum. Philip. Flow. Pl. 2 (1923) 230; Li, Woody Fl. Taiwan (1963) 307; Liu & Su, Fl. Taiwan 3 (1977) 125. — Type: *Cuming 808*, chosen here as lectotype, duplicates seen from B, BM, K, P; syntype: *Vidal* (Rev. Pl. Vasc. Filip.) 294, seen from L.

R. elmeri Focke, Bibl. Bot. 72 (1910) 112; Merr., Enum. Philip. Flow. Pl. 2 (1923) 227. — Type: not explicitly mentioned. Focke refers to specimens from Mt Data (probably *Merrill BS 4651*, seen from B, NY) and Pauai (probably *Mearns BS 4305*, seen from L).

R. calycinoides Hayata, Icon. Pl. Form. 3 (1913) 88, nom. illeg., non *R. calycinoides* Kuntze, Meth. Speciesbeschr. (1879) 67, 78, from Himalaya; Koidz., J. Coll. Sci. Univ. Tokyo 34, art. 2 (1913) 154; Liu, Ill. Lign. Pl. Taiwan 1 (1960) pl. 397; Li, Woody Fl. Taiwan (1963) 303, incl. var. *macrophyllus* Li; Liu & Su, Fl. Taiwan 3 (1979) 109. — Type: *Mori & Kato s.n.* from Mt Morrison, Taiwan, not seen.

Sprawling shrub with prostrate long shoots up to 1 m, sometimes several metres long, and with axillary, ascending, leafy shoots, up to 25 cm long and terminating in an inflorescence, more rarely climbing shrubs (see note 1). Prostrate twigs woody, (greyish) brown with often flaky bark, rooting; young twigs densely covered with an indumentum of thin, curly, interwoven hairs and longer, thicker, straight to wavy, patent to appressed hairs; prickles few to very few, less than 1 mm long, directed downwards. Leaves simple. *Stipules* rather long persistent, elliptic to obovate in outline, 6–10(–13) by 2½–4(–7) mm, shallowly to ± halfway incised, the incisions sometimes only from the top, sometimes from the margins, densely hairy outside, glabrous inside. *Petioles* ½–3(–4½) cm long, indumentum as on the young twigs, unarmed or with some prickles. *Leafblades* ± orbicular to triangular in outline, length/width 0.9–1.1, 2–5½(–9) by 2–5(–9) cm, shallowly 3- to 5-lobed, the incisions on-

ly in the largest leaves up to $1\frac{1}{2}$ cm deep; base cordate, basal incision up to $1\frac{1}{2}$ (–2) cm deep, its margins sometimes \pm parallel, usually the basal angle larger than 90° , basal lobes rounded, margins unevenly crenate with 6–10 teeth per cm, apex rounded to acute; stiff-coriaceous; nervation pedate, with on each side at the base of the midrib 2 main side nerves, each having 2–4 basiscopic lateral nerves, on the midrib 2–3 pairs of lateral nerves above the basal ones, nerves terminating in the margin, venation widely reticulate, nerves and veins impressed above and the squarish inter-venal fields bullately raised, nervation strongly prominent below; upper surface sparsely or rarely more densely hairy when young, soon glabrous, lower surface with a dense felt of thin, curly hairs and on the nerves and veins also with longer, patent, straight hairs, sometimes with few small prickles on the midrib; dark brown above when dry, lightbrown below. *Inflorescence* (see also note 1) terminal on the last-order branches, simple racemes, usually very dense, consisting of (1–)3–6(–8) flowers of which the lowermost (rarely the lower two) may be in a leaf-axil, otherwise bracteate, the raceme ending in a flower which opens first, the racemes up to 3 cm long; lateral flowers \pm sessile, *pedicel* of terminal flower up to 5 mm long; densely hairy as is the axis of the raceme; *bracts* up to c. 13 by 10 mm, apically incised, sometimes shaped like a reduced leaf with adnate stipules, densely hairy above, glabrous below; bracteoles like the bracts, slightly smaller. *Flowers* bisexual; flowerbuds ovoid. *Hypanthium* saucer-shaped, 4–6 mm across, densely short-woolly and with long, straight and thicker, appressed hairs outside, glabrous inside except a ring of hairs around the torus. *Sepals* triangular with acute to acuminate apex, outer ones 6–10 by 3–8 mm, with on each of the uncovered margins 1, 2 or 3 small teeth, teeth up to 3 mm long but usually smaller, inner sepals often narrower, the covered margins entire, sepals growing up to a length of 13 mm after anthesis, both surfaces densely covered with a felt of short woolly hairs, the outside on the not covered parts also with long, straight, appressed hairs. *Petals* \pm orbicular with rounded apex, up to 14 by 12 mm including the $1-1\frac{1}{2}$ mm long claw, white, glabrous. *Stamens* 120–140; filaments up to 5 mm long, glabrous; anthers $\frac{1}{2}$ –1 mm long, slightly longer than wide or \pm equal, incised at base and less so at apex, dorso-versatile, latero-introrse, thecae glabrous or with one to few long hairs on top and sometimes also elsewhere. *Pistils* 40–80, glabrous; ovary c. 1 mm long; style up to 5(–8) mm long. *Torus* elevated, hairy. *Collective fruit* globular, c. 1 cm diam., sepals closing after anthesis, spreading again under the ripe fruits; fruits $2-2\frac{1}{2}$ by $1\frac{1}{2}$ mm; exocarp soft and probably rather thick *in vivo*, a thin layer when dry, yellow to orange, also reported as pink or red; endocarp distinctly rugose.

Distribution. Taiwan, Philippines (Luzon and Negros; according to Elmer, 1908, and Merrill, 1923, also on Mindoro).

Habitat. Forests and more open places like clearings in higher altitudes, from c. 1500 to 2700 m altitude, once collected at 930 m. This refers to the Philippines, but data from Taiwan agree with it.

Vernacular name (as reported on a herbarium label). Polnit (Bontoc language, Luzon).

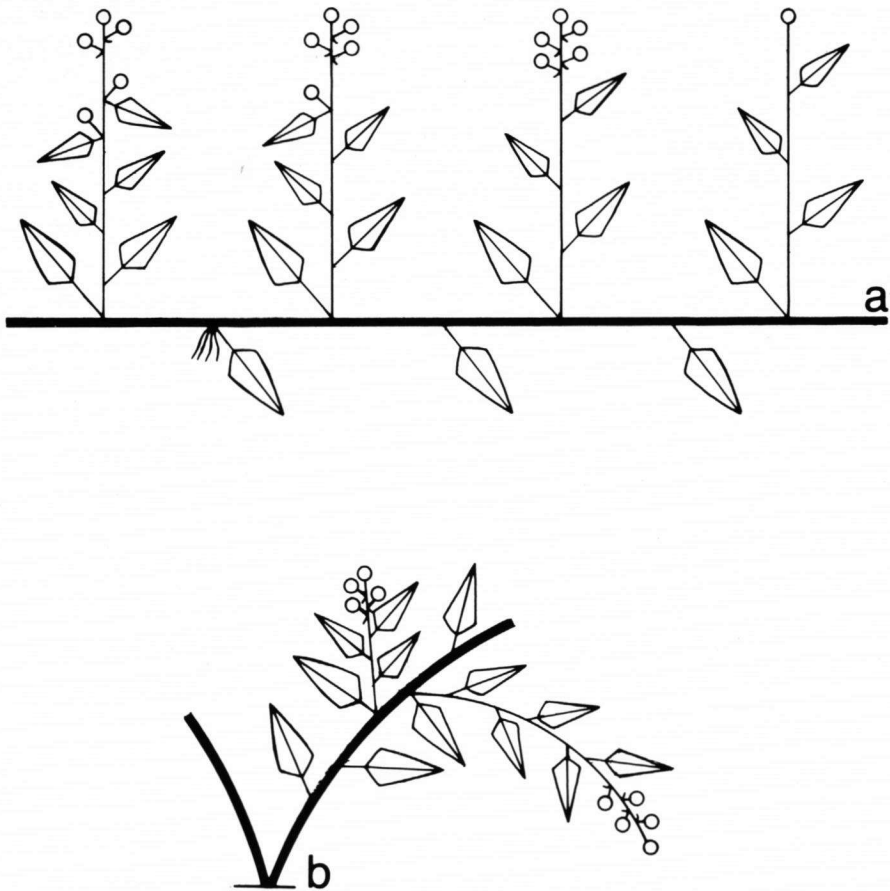


Fig. 5. *Rubus rolfei*, different habits, schematic. — a. Prostrate, rooting last-but-one-order branches; upright laterals terminating in an inflorescence of which the lower flower(s) may be axillary to a leaf. The inflorescence may sometimes be only 1-flowered (right). No transformation series is implicated in this figure. — b. Shrub with climbing last-but-one-order twigs, the laterals terminating in an inflorescence. Stages transitional between a and b are not difficult to imagine and will occur in nature.

PHILIPPINES. Luzon. Ilocos Norte Prov.: Mt Bubonbilit, Iwatsuki c.s. P 445. — Mountain Prov.: Mt Pulog, several collections; Mt Santo Tomas, Britton 302; Mt Data, Merrill BS 4651, Micholitz s.n.; Mt Tabayoc, Jacobs 7581; Mt Abbocot, Mendoza PNH 40921; Baguio, Elmer 5792, 8739, Fosberg 35060, Steiner 35843; Pauai, Mearns BS 4305; Bontoc Subprov., Madulid & Reid PNH 113404, Vanoverbergh 2063; Benguet Subprov., Barnes FB 949, Loher 2244, Merrill 857. — Quezon Prov.: Mt Banahao de Lucban, Loher 5983, 5988, Vidal 294; Tayabas Subprov., Cuming 808. — Negros. Mt Canlaon, Edaña PNH 22011, Merrill 222; without loc., Whitehead s.n.

Notes. 1. As too often the case, herbarium specimens and their labels do not give the information necessary for a good mental image of the growth habit. From plants and labels it is obvious that most of the plants collected had prostrate woody twigs with erect, determinate, short laterals terminating in an inflorescence (see fig. 5). The last-but-one order branches, however, are not always creeping but sometimes climbing and maybe there are even bushy plants with more or less erect branches. Possibly this will be largely determined by local conditions.

Herbarium specimens of creeping plants may look rather different from collections made from climbing shrubs, but in essential characters apart from habit they are alike.

The distinction in the floras of Taiwan (Li; Liu & Su) of *R. calycinoides* Hayata with prostrate stems and *R. rolfei* with scandent stems seems to be based on the difference in habit only. Their relationship is obscured in these floras by the systematic place of *R. calycinoides* in subgenus *Chamaebatus*, probably by confusion with *R. calycinus* D. Don.

Field observations in this matter, and better annotations on the labels are obviously wanted.

2. The species is related to *R. bürgeri* Miq. which is known from Japan (and Taiwan?). *Rubus perfulvus* Merr. (see below) is also related, but not sufficiently known.

3. The leaves, although much smaller, look like those of *R. chrysophyllus* Miq. which also have the bullate upper surface. The inflorescences are quite different and the two species are obviously not very closely related.

4. The description given above was made up after the Philippine material only. The seven specimens from Taiwan that I investigated, are not different.

5. The fruits are edible and sweet tasting, as several collectors say on their labels. It is remarkable that they do not agree about their colour.

18. *Rubus perfulvus* Merrill

R. perfulvus Merr., Philip. J. Sc. 20 (1922) 386; Enum. Philip. Flow. Pl. 2 (1923) 229. – Type: *Ramos & Edaño BS 38566* from Mt Lipa, Mindanao, holo lost, iso seen from A, BM, BO, K, L, P.

Scandent shrub. Young branches densely hairy, with few and short prickles. *Stipules* large and persistent, up to 15 by 3 mm, entire. *Petioles* 1–1½ cm. *Leafblades* ovate, not or hardly lobed, length/width 1.3–1.4, 5–9 by 4–7 cm; base truncate to rounded, margin grossly dentate, apex acuminate; stiff-coriaceous; 3-nerved, the two lateral main nerves with \pm 4 basiscopic side nerves, the middle nerve with \pm 4 pairs of laterals, nerves and veins impressed above and the leaf surface \pm bullately raised between them, below only the large veins visible because of the dense indumentum; upper surface scattered long-hairy, glabrescent, lower surface with a very dense and thick woolly felt of interwoven, curly hairs and with on nerves and veins longer, straight, appressed hairs; darkbrown above, light reddish brown below when dry. *Inflorescence* not seen, according to Merrill a terminal, 5-flowered, compact raceme

and also some solitary flowers in the upper leaf axils (only the latter seen). *Flowers* large, only seen in the old, fruiting stage. *Sepals* triangular, c. 12 by 3–4 mm, outer ones with few short marginal teeth. *Petals* not seen. *Stamens* few seen, probably with dorsifixed glabrous anthers. *Collective fruit* c. 1½ cm diameter; fruits red, according to Merrill, glabrous, when dry with the exocarp as a thin membranous layer around the rugose endocarp, the latter c. 3 mm long.

Note. This is a very insufficiently known species which, however, seems to be worthy of recognition. As Merrill stated, it is most closely related to *R. rolfei* Vidal; it differs from the latter most conspicuously in its leaves having a truncate base. With *R. luzoniensis* Merr. it has the entire stipules in common.

The specimen was collected in the mossy forest, at c. 2000 m altitude.

19. *Rubus malvaceus* Focke

R. malvaceus Focke, Bibl. Bot. 72 (1910) 81, f. 30; Thuan, Fl. Camb., Laos & Vietn. 7 (1968) 51; Fl. Thail. 2 (1970) 56, both excl. the Continental specimens (see note 2). — *R. moluccanus* L. var. *malvaceus* (Focke) Backer, Schoolfl. (1911) 458; Backer & Bakh. f., Fl. Java 1 (1964) 517. — Type: *Ploem* 19980, holo in B, iso seen from BO.

R. wichurae Focke, Bibl. Bot. 72 (1910) 79. — Type: *Wichura* 2092, holo in B.

Shrub, with overhanging branches (once noted). *Twigs* with a dense felt of thin, curly hairs and with long, straight, semi-appressed to patent hairs, indumentum light-brown, long persistent, prickles not many, curved downwards, up to 3 mm long. *Leaves* simple. *Stipules* rather persistent, pinnatifid to digitate-pinnate with the lobes ½–1½ mm wide, 15–18 by 12–18 mm, stiff-hairy outside and on margins, (almost) glabrous inside. *Petioles* 1½–6(–8) cm long, indumentum and prickles as on twigs. *Leafblades* broadly ovate to suborbicular in outline, length/width 1.0–1.2, 7–15(–19) by 7–15(–17) cm, distinctly 5- to 7-lobed, the incisions 1–2(–3) cm deep; base cordate, basal incision 1½–2(–3) cm deep, basal angle 90° or less, basal lobes rounded, margin rather evenly serrate with 6–8 teeth per cm, apex usually acute; stiff-coriaceous; nervation 5-palmate, the lowermost main nerves pedately nerved, their basal side nerve going into the smaller basal lobe, 3–5 pairs of side nerves on each of the main nerves, nerves terminating in the margin, venation reticulate, nerves and veins impressed above and surface distinctly bullate between the veins, nervation prominent below; upper surface densely hairy on nerves, veins and between the veins, lower surface with a dense felt of long, curly hairs all over and with many long, patent hairs on nerves and veins, some prickles on midrib below; leaves when dry darkbrown above, yellowish brown below. *Inflorescences* terminal, consisting of up to 12 cymose laterals, the lower 4–5 in the axils of normal or smaller leaves, the upper 3–7 in axils of bracts, the entire inflorescence 20–25 cm long, narrow; laterals shorter than supporting leaves, up to 3 cm, sessile or shortly peduncled, with 2–4 flowers, the most basal laterals sometimes raceme-like with c. 10 flowers of which the lower ones in 2- or 3-flowered cymes; axes of the inflorescence hairy as the twigs; *pedicels* up to 1 cm, hairy; *bracts* pinnatifid, up to c. 13 by 11 mm, with up to 6 pairs of lobes, those up to 5 by ½ mm, hairy outside, glabrous

inside; bracteoles similar. *Flowers* bisexual; flowerbuds ovoid. *Hypanthium* cup-shaped, 6–10 mm across, up to 2 mm high, outside with a dense woolly felt and long, semi-patent hairs. *Sepals* recurved at top during anthesis, triangular, 7–10 mm long, outer ones with 1–3 teeth on each of the not-covered margins, the teeth up to 2(–3) mm long, inner sepals entire, outer sepals 4–8 mm wide, inner ones 3½–6 mm, outside with indumentum as hypanthium, inner surface shortly woolly. *Petals* ± erect in anthesis, suborbicular, 5–6 by 5–5½ mm, claw up to 1 mm long, margin undulating to crenate, glabrous, white. *Stamens* 100–200, not surpassing petals in anthesis; filaments up to 5 mm, glabrous; anthers ½–¾ mm long, dorsifixed, introrse, with long hairs on top. *Pistils* 60–80, glabrous; style up to 7½ mm long, protruding beyond the petals in anthesis. *Fruits* 2–3 by 1½–2 mm; colour of exocarp unknown; endocarp rugose.

Distribution. West Java, Sumba (see note 2).

Habitat. Hardly any data, montane? (one collection from 1300 m altitude).

Vernacular name. Rikarara (Sumba).

JAVA. West. Sindanglaya, Ploem 19980, Sargent s.n.; Sinapeul near Cibodas, van Ooststroom 13982; Lembang (Mt Tangkubanperahu), Wichura 2092; without locality, Junghuhn Pl. Ined. 296, Reinwardt s.n.

LESSER SUNDA ISLANDS. S u m b a. Kanangar, Iboet 504.

Notes. 1. *Rubus malvaceus* seems to be quite closely related to *R. rugosus* J.E. Smith which is known from the Asian continent and Sri Lanka, and of which the delimitation and status can only be evaluated after a thorough and integrated study of the group from the whole region: Sri Lanka, India, China, continental Southeast Asia. For this study a firm basis has been laid in the partial revisions by Thuan and Tirven-gadam.

It seemed premature to reduce *R. malvaceus* to the synonymy of *R. rugosus* but the possibility of this solution being the better one remains open.

2. Thuan mentioned the species for N. Thailand and from the environs of Hué, Vietnam, citing only one specimen of each region, specimens which I did not see. In view of his description (also in the keys) of the leaves ('thin') and flowers ('small, 1 cm diam.') I suspect that he had a wrong image of *R. malvaceus*.

3. From *R. alceifolius* Poir. the present species differs in having ovoid flowerbuds and stipules with wider (not filiform) lobes. Otherwise there is much resemblance.

4. From well-known Java there are only very few collections. I have considered the possibility that the collections made by Ploem and Van Ooststroom in localities very near the botanic garden at Cibodas could be escapes from that garden. There is, however, in none of the catalogues of the Botanic Gardens Bogor an indication that the species has ever been cultivated at Cibodas. It lived for a certain period in the Bogor garden itself: a collection in BO numbered XII.A.208 and dated 1889 bears record of that. According to Boldingh's list of 1916 the plant with that number (under the name *R. moluccanus*) had disappeared then.

The specimens from Lembang and Sumba make it improbable that the species was introduced. Which leaves its patchy distribution un-explained!

20. *Rubus glomeratus* Blume

- R. glomeratus* Bl., Bijdr. 17 (1827) 1111; Miq., Fl. Ind. Bat. I, 1 (1855) 381; Focke, Bibl. Bot. 72 (1910) 90, f. 37, excl. var. *albulus* Focke, l.c. 91, which is *R. moluccanus* (see also note 8); Koord., Exk. Fl. Java 2 (1912) 324. Non Hook. f., Fl. Brit. India 2 (1878) 328 et auctt. al. (see note 4). — *R. moluccanus* L. var. *glomeratus* (Bl.) Backer, Schoofl. Java (1911) 458; Backer & Bakh. f., Fl. Java 1 (1964) 517. — Type: *Blume s.n.*, holo in L, sheets nr. 905.130-133 & -134.
- R. glabriusculus* Hassk., Flora 27 (1844) 586; Cat. Hort. Bot. Bogor (1844) 267; Miq., Fl. Ind. Bat. I, 1 (1855) 383; Kuntze, Meth. Speciesbeschr. (1879) 63, 78, excl. Himalaya specimens; Focke, Bibl. Bot. 72 (1910) 92. — *R. moluccanus* L. var. *glabriusculus* (Hassk.) Kuntze, Rev. Gen. Pl. 1 (1891) 222. — Type: not explicitly mentioned, from Java, sterile. A sheet (nr. 905.130-132) from the Blume collection at L probably is part of the type.
- R. sundaicus* Bl. sensu Kuntze, Meth. Speciesbeschr. (1879) 60, 76, type not included.
- R. glomeratus* Bl. var. *gracilis* King, J. As. Soc. Beng. 66, ii (1897) 295. — Type: not mentioned. *Wray 1485* belongs to the original material, seen in BM, K.
- R. ledermannii* Focke, Bot. Jahrb. 56 (1916) 79; van Royen, Phan. Monogr. 2 (1969) 91, f. 23. — Type: *Ledermann 11651*, holo in B (lost), neotype designated by Van Royen: *van Royen NGF 30159*, holo in BISH, iso seen from L.
- R. robinsonii* Ridl., J. Fed. Mal. St. Mus. 8 (1917) 31. — Type: a specimen collected by Robinson & Kloss on Mt Kerinci in Sumatra, according to the protologue at Sungei Kumbang, 4500', with white flowers. These notes agree with the label of *Robinson & Kloss 132* at BM, which bears the unpublished name *R. elongatus* var. *sericeus* Ridl., not the name *R. robinsonii*. Ridley compares the latter species with *R. elongatus* and specifically mentions the silky calyx as a difference.
- R. ledermannii* Focke var. *beleensis* van Royen, Phan. Monogr. 2 (1969) 93, f. 24. — Type: *Brass 11035*, holo in A, iso seen from BO, L.
- R. moluccanus* L. var. *moluccanus*, p.p., sensu van Royen, Phan. Monogr. 2 (1969) 102.

Climbing, trailing or scrambling shrub, $\frac{1}{2}$ –3 m high or long. Young *twigs* very sparsely to rather densely covered with thin, short curly hairs, never forming a closed felt and with an overlying, rather to very dense indumentum of longer, thicker, straight, appressed to patent hairs, the yellow-brown indumentum disappearing with age, the twigs then usually dark to even blackish brown; prickles usually few and weak, up to 2 mm long, curved downwards. The lateral branches with a number of stipular kataphylls at their base. Leaves simple. *Stipules* early falling, elliptic, $\frac{3}{4}$ –2 by $\frac{1}{2}$ –1 cm, dentate to pinnatipartite with up to 6 pairs of teeth or lobes, appressedly hairy outside, hairy to glabrous inside. *Petioles* 1–5(–7) cm long, indumentum and prickles as on the twigs. *Leafblades* broadly ovate in outline, length/width 1–1.3 (rarely –1.5, in Malaya –1.8, in Aceh –2.0), 4–15 by $3\frac{1}{2}$ –13 cm, shallowly 3(–5)-lobed to hardly lobed at all, the incisions generally not deeper than 1 cm, up to 2 cm in some of the largest leaves, which are rarely present in the herbarium; base cordate, basal incision $\frac{1}{2}$ –2(–3) cm deep, basal angle c. 90° or less, rarely more than 90°, near the inflorescence leaves sometimes with a more or less truncate base, basal lobes rounded, margins \pm evenly serrate with 6–8 teeth per cm, apex acute; coriaceous; nervation pedate, with on each side at the base of the midrib 2–3 main side nerves, each having 3–4 basiscopic lateral nerves, on the midrib 3–4 pairs of lateral nerves, nerves terminating in the margin, venation reticulate, nerves and veins flat to

slightly impressed above, rather prominent below; upper surface sometimes slightly bullate, straight-hairy on nerves and veins and sometimes also between veins, when mature only hairs left on the largest nerves, lower surface with on nerves and veins a small and variable amount of short curly thin hairs, very rarely approaching a closed felt but the leaf surface always visible, sometimes these curly hairs quite absent or hardly to be found, over this a rather dense to rather scattered brownish indumentum of long, straight to \pm wavy, patent to semi-appressed, thicker hairs, some prickles on large nerves below; darkgreen to olive-green above, paler green and covered by brown hairs underneath, *in sicco* also two-coloured, but in the Western part of the area often only slightly so or not at all. *Inflorescence* often very poorly developed (at least on herbarium sheets!), a terminal thyrsus consisting of up to 6 lateral, bracteate cymes under the terminal flower, the cymes 3- to 1-flowered, the upper cymes often congested (glomerate), the lower ones more distant; sometimes also cymes or thyrsi of cymes in the axils of the upper leaves; thyrsi rarely longer than 10 cm, peduncle up to 5(–7) cm long, densely hairy as is the rachis of the inflorescence; *pedicels* up to 5(–10) mm long, densely hairy; *bracts* pinnately divided, up to 12 by 10 mm, with up to 7 lobes on each side, appressedly hairy outside, glabrous inside; bracteoles similar but smaller and with smaller teeth, up to 5 by 3 mm. *Flowers* bisexual; flowerbuds ovoid, pointed. *Hypanthium* cupular, 4–7 mm across, slightly larger (–9 mm) under the ripe fruit, 1–2 mm high, outside densely woolly and with patent to appressed long hairs, rarely with short stalked glands (see note 3), the indumentum brownish, inside with a ring of hairs around the torus. *Sepals* triangular, apex sharply pointed, outer ones with 2–6 teeth on each of the not-covered margins, the teeth 2–3 mm long, rarely shorter, the covered margins entire, outer sepals 6–9 by 4–7 mm, the inner sepals slightly narrower than the outer ones, sepals smaller and with few short teeth in Malaya, indumentum outside as on hypanthium, tomentelous inside. *Petals* erect in anthesis, soon falling afterwards, suborbicular to \pm obovate or obcordate, $4\frac{1}{2}$ –10 by 3–8 mm, in anthesis \pm as high as the sepals, base tapering and not distinctly clawed, margin undulating, apex rounded or emarginate, white (once noted as pink), sometimes with hairs on outer surface. *Stamens* 24–120, in New Guinea not more than c. 60; filaments up to 6 mm long, glabrous, rarely hairy (see note 3); anthers $\frac{1}{2}$ –1 mm long, incised at base and apex, dorso-versatile, latero-introrse, glabrous or with 1 to 5 hairs on the top, connective often swollen on backside. *Pistils* 30–60, glabrous; ovary c. 1 mm long; style up to 6 mm long, in anthesis not surpassing petals. *Torus* elevated, hairy. *Collective fruit* \pm globular, up to 8 mm diam., sepals closing after anthesis, staying erect around the ripe fruits; fruits curved, 2–4 by 1–2 mm when dry; exocarp orange-red to red, *in vivo* probably juicy, *in sicco* present as a thin membranous layer; pyrene 2–3 by 1–1½ mm, with rugose endocarp.

Distribution. Sumatra, Malaya, Java, S. Celebes, New Guinea, New Britain. See note 5.

Habitat. In forest (usually reported to be secondary or disturbed) and in open places like clearings, riverbanks, landslides, roadsides, forest edges, shrubberies, at altitudes of (1200–)1600–3000 m, very rarely lower.

Vernacular names (as reported on herbarium labels). Pingat, una (both W. Sumatra), tiri (New Guinea, Ialibu).

SUMATRA. Aceh. Boer ni Bias, van Steenis 6179; Blangkejeren, van Steenis 9376; Paloh, van Steenis 9440; Ketambe, de Wilde c.s. 12462. — West. Mt Kerinci, many collections. — Bengkulu. Suban Ajam, Ajoeb 270.

MALAYA. Perak. Batang Padang valley, Wray 1485; without loc., Scortechini s.n. Penang I. Ayer Hitam Dam reserve, Hardial & Samsuri 235; Government Hill, Curtis = 74.

JAVA. West. Mt Salak, Kuntze 4832; Mts Gede—Pangrango, several localities, many collections; Malabar, Kuntze 5438, 5439. — East. Prigi, Lörzing 1039; Mt Tengger, Gisius 33.

CELEBES. South. Mt Lompobatang (Bonthain), Bünneimeijer 11847, 12187.

NEW GUINEA. Irian Jaya. Vogelkop Peninsula: Arfak Mts, Kanehira & Hatusima 13600; Mt Nettoti, van Royen 3888. — Snow Mountains: Wissel Lakes, Eyma 5221; Idenburg river, Brass 12329; Lake Habbema, Brass 11035, 11375; Mt Hellwig, Pulle 922. — Papua New Guinea. W. Sepik Prov.: Telefomin Subprov., Kalkman 5229, 5268, Vinas & Wiakabu LAE 59507. — E. Sepik Prov.: Angoram Subprov., Dornstreich 264. — Morobe Prov.: Wau, van Royen 4352; Saruwaged Range, Clemens 5657, 5915a; Langimar river, Craven & Schodde 1330. — Western Highl. Prov.: Wabag Subprov., Henty NGF 20605, Womersley NGF 11217; Mt Kuni, Womersley NGF 9515. — Eastern Highl. Prov.: Fatima river, Womersley NGF 24595; Mt Wilhelm, van Balgooy 522, 889, Borgmann 200, Brass 30685, 30714. — Southern Highl. Prov.: Tari Subprov., Gillison NGF 25215, Kalkman 4675, 4734; Mendi Subprov., Katik NGF 32927, Vandenberg c.s. NGF 40082; Ialibu Subprov., Andrew LAE 57017, Womersley & Woolliams NGF 12394, NGF 24992; Mt Giluwe, Croft c.s. LAE 60743. — Central Prov.: Wharton Range, van Royen NGF 30159; Mt Tafa, Brass 4932. — Milne Bay Prov.: Mt Suckling (Goropu Mts), Veldkamp & Stevens 5890; Mt Dayman, Brass 22689.

BISMARCK ARCHIPELAGO. New Britain. Mt Lululua, Isles c.s. NGF 34409, Stevens & Lelean LAE 58211.

Notes. 1. *Rubus glomeratus* was described from Java and specimens from Sumatra were early recognized as conspecific. The New Guinean material, however, was identified by Van Royen as *R. ledermannii* Focke. Careful comparison and evaluation of the differences led me to the conclusion that only one species is concerned here.

Specimens from Java and Sumatra differ slightly from the New Guinean specimens. Omitting overlapping measurements of flowerparts, the differences boil down to the following: *Java and Sumatra*: stamens 75–120, anthers glabrous; *New Guinea*: stamens 24–60, anthers usually with 1 or 2, or even up to 5 hairs on top, very rarely glabrous. The material from *Celebes* resembles the West Malesian specimens. The specimens from *Java* are often more pronouncedly 3–5-lobed than is usual in New Guinea.

2. Material from Malaya was the base of *R. glomeratus* var. *gracilis* King. I saw only four collections from Malaya, three of them old ones. On the basis of this insufficient material I am inclined to think a separate variety justified. It is characterized against typical *glomeratus* (which obviously does not occur in Malaya) by relatively longer leaves and smaller flowers on longer pedicels. New material is wanted for a better based decision.

In the meantime I give a short description of var. *gracilis*. Leaves shallowly 5-lobed to unlobed, lateral incisions up to 1 cm deep, basal incision sharp to right-angled, leaves $8\frac{1}{2}$ – $12\frac{1}{2}$ by 6–8 cm, length/width 1.4–1.8. Inflorescence a 12–20 cm long,

narrow thyrus with some 10 lateral racemes or thyrsi of which at most three in the axil of a leaf. Flowers on up to 1 cm long pedicels. Hypanthium $3\frac{1}{2}$ – $4\frac{1}{2}$ mm across. Sepals triangular, outer ones $4\frac{1}{2}$ –5 by 3 mm, with one short tooth close under the margin on each uncovered margin, inner sepals narrower and entire. Petals elliptic, not or hardly clawed, about as long as the sepals, 4–5 by 2–4 mm. Stamens 50–85, anthers hairy on top or glabrous. Pistils 30–40.

3. Some collections from Mt Kerinci, Sumatra, have stalked glands on the outside of the hypanthium and the sepals (and sometimes on the pedicels). Except one (*Robinson & Kloss 132*) these specimens (*Bünnemeijer 8402, 8475a, 8759*), moreover, have hairy filaments. The latter were also found in the four specimens from Aceh, Sumatra, which do not possess the glands but are, on the other hand, distinguished by their hardly lobed leaves with a large leaf-index (length/width up to 2.0). The stalked glands on the flowers may be the result of introgression, possibly after a cross with *R. pyrifolius* J.E. Smith. The hairy filaments, however, are a unique character for the subgenus in Malesia and it might be considered to be sufficient basis for a separate variety. Long leaves are also known from 'var. *gracilis*' (see note 2) but this has small flowers whereas the specimens referred to above have normal-sized flowers.

4. The species is obviously closely related to *R. moluccanus* L. but it can be separated by means of its leaf indumentum, which misses the closed felt of thin curly hairs typical for all varieties of the latter species (see fig. 2). In view of its remarkable area (see note 5) one might speculate about possibilities of it being polyphyletically derived from *R. moluccanus* through loss of the felt, which after all may well be a genetically very simply controlled character. In that case the derival would have to be from var. *moluccanus* with which *R. glomeratus* shares characters of leaf-shape and indumentum type. Var. *moluccanus* is a widely distributed lowland species which occurs rarely above 1500 m, while *R. glomeratus* is distinctly a montane species occurring from c. 1200 to 3000 metres. A connection between a montane habitat and loss of felt is, to say the least, not obvious.

In New Guinea Van Royen distinguished a var. *beleensis* in *R. ledermannii*, with less hairy leaves than the type. There is a wide diversity in this respect, which is only partly due to the age of the twigs. Most of the Western material would fall within 'var. *beleensis*', but I have refrained from recognizing more and less hairy varieties, because of the gradualness of the distinction.

5. With certainty the species is known from a restricted area of distribution: Sumatra, Malaya and Java in the Western part of Malesia, S. Celebes, New Guinea and New Britain in the Eastern part. A record from Borneo (Merrill, Pl. Elm. Born., 1929, 92) is based on *Elmer 21189* which is *R. moluccanus*. From the Moluccas I saw only one sheet (*Eyma 2293*, Seram, BO) which might belong to *R. glomeratus* but differs in some flower details the weight of which cannot yet be judged. Presl and others cited the species from the Philippines and Focke described var. *pileanus* from Luzon without citation of a specimen. The only Philippine specimen I saw, which may belong to *R. glomeratus* is *Vanoverbergh 2683*, the type of *R. vanoverberghii* Merr. (see Dubious names, p. 385).

Its presence in the Moluccas and Philippines remains uncertain for the time being. From the Lesser Sunda Islands there are no records.

6. As also evident from note 5, there has been a lot of confusion around *R. moluccanus* and *R. glomeratus*. Especially in West and East Malaysia the latter name has been wrongly applied to specimens of (different varieties of) *R. moluccanus*, e.g. by Hooker f., Fl. Brit. India 2 (1878) 328; Kuntze, Meth. Speciesbeschr. (1879) 46; King, J. As. Soc. Beng. 66, ii (1897) 295, excluding var. *gracilis*, see note 2; Ridley, Trans. Linn. Soc., Bot. 9 (1916) 35; Fl. Mal. Penins. 1 (1922) 679. Several authors (Backer, Van Royen) reduced the species to *R. moluccanus*, sometimes as a variety. Since *R. moluccanus* is large enough as it is, and since it is not really difficult to separate *R. glomeratus* from it, it is better to distinguish it on the specific level (see also note 4).

7. The specimen *Henty NGF 20605* from New Guinea has deviating flowers on deviating, lax inflorescences. The pedicels are several cm long, the sepals reach a length of 17 mm, the ovaries are malformed, c. 1½ cm long including a hairy, stalk-like lower part. In *Womersley & Woolliams NGF 24992* this kind of flowers is also present (although not with these very long sepals) together with normally developed flowers (in the fruiting stage).

8. The three varieties Focke (1910) described, cannot all be brought home. Under *R. glomeratus* var. *albulus* two specimens were cited: from Ambon *Boerlage s.n.* which I did not see, from Celebes *Koorders 28639* which is *R. moluccanus* var. *moluccanus*. For var. *pileanus* see note 5 and Dubious names, p. 383. Var. *griseolus* from Java (no specimens cited) may consist of more distinctly lobed forms of *R. glomeratus*.

INCOMPLETELY KNOWN SPECIES

Rubus spec. (1)

One twig of an unknown taxon was found in unmounted material from P, mixed with *Raynal 17623* (*R. moluccanus* L. var. *obtusangulus*) from Mt Jaya (Carstensz) in West New Guinea, 2050 m altitude. I labelled the specimen *Raynal 17623A*.

The leaves on this twig are ovate-triangular, c. 8 by 5 cm, unlobed, truncate at base, densely hairy beneath with a woolly felt and patent straight hairs. The flowers have large sepals, 8 mm long, the outer ones with 3 teeth of up to 1½ mm on the uncovered margins, the petals are only 4½ mm long, the number of stamens is c. 35. The fruits are hairy on the backside at the top and at the base of the style.

The specimen cannot be matched with any known species. There are similarities with *R. moluccanus* L. where it does not fit any of the varieties and with *R. keterios* van Royen which is the only other species in New Guinea where hairy fruits were observed, but which has distinctly 3-lobed leaves. The leaves are rather like those of *R. perfulvus* Merr. from the Philippines which differs in the much larger flowers.

Rubus spec. (2)

Three collections from Flores, all from Mt Ranakah or near it, and obviously conspecific, cannot be placed in one of the recognized species.

It is a big climber up to 20 m long and with stems 2 cm thick, growing at an altitude of 1200–2100 m. Flowering twigs almost unarmed. Stipules (few seen) pinnatipartite. Petioles 3–6 cm. Leafblades 3-lobed, length/width 1.0–1.2, 6–12 by 6–12 cm, base subtruncate to shallowly cordate with the basal angle more than 90°, nervation 5-palmate to palmate-pedate, flat to slightly impressed above, underside covered with a woolly felt all over and patent hairs on nerves and veins. Flowers unisexual and plants dioecious, as far as can be ascertained. One of the specimens (*Verheijen 3399*) has distinctly female flowers, *Schmutz 391* is male. In these specimens the organs of the other sex are present but obviously reduced and non-functional. The third specimen (*Schmutz 3406*) has abnormally developed flowers with malformed but still polliniferous anthers and reduced pistils. In the one female collection the pistils are hairy. Sepals 4½–5 by 3½–4½ mm, with short teeth on the uncovered margins, petals of about the same length (?). Stamens or staminodes 70–80, in one flower some anthers with hairs on apex, others glabrous. Fruits not seen.

These collections do certainly not belong to one of the species which are known or suspected to be (gyno)dioecious: *R. beccarii* Focke, *R. cumingii* Kuntze, *R. elongatus* J.E. Smith, *R. luzoniensis* Merr., *R. smithii* Backer. From the species with bisexual flowers, in which they could be placed as anomalous specimens, *R. moluccanus* L. and *R. chrysophyllus* Miq. are closest. Both are known from the Lesser Sunda Islands. Hybridization between one of them and one of the dioecious species can be no solution, since none of the latter is known from the islands.

I am almost convinced that this is a new species but before describing it formally, I want to see more material with older flowers.

Rubus spec. (3)

In 1966 I collected a specimen (*Kalkman 4856*) with a remarkable combination of characters. It has simple, 3-lobed leaves reminding of some *R. glomeratus* Bl. specimens, and the twigs, petioles, inflorescences, pedicels, hypanthium and outside of sepals are covered with many stout straight prickles and stalked glands, apart from their hair-cover.

In Malesia there is not a single species of subgenus *Malachobatus* which has prickles and stalked glands up to the sepals. It is a feature reminding of some species of subgenus *Idaeobatus*, e.g. *R. lorentzianus* Pulle (see Zandee & Kalkman, *Blumea* 27, 1981, 101). I wonder whether the specimen could be an intersubgeneric hybrid (see also note 4 under *R. lineatus* Bl., p. 324) and it may be significant that I found only one plant although the region was extensively covered. The brambles of montane New Guinea are well-known and it is not very probable that the collection represents a new species. It was collected in Papua New Guinea, Southern Highlands Province, Tari District, pass between Mt Ne and Mt Kerewa, alt. 2890 m, margin of forest.

DUBIOUS NAMES

R. chartaceus Kuntze, Meth. Speciesbeschr. (1879) 61, 76. — Type: a Kuntze specimen collected at Kuripan near Bogor, Java, 150 m alt.

I did not see any Kuntze collection with this name or with the number (24) the species has in his monograph.

R. chrysophyllus Reinw. ex Miq. forma **densiflora** Kuntze, Meth. Speciesbeschr. (1879) 56.

This is probably only an insignificant form of the species, but I did not see authentic material, although Kuntze recorded it from a specimen in L.

R. edanoi Merr., Philip. J. Sc. 13 (1918) Bot. 14; Enum. Philip. Flow. Pl. 2 (1923) 227. — Type: *Ramos & Edaño BS 26505* from Luzon, holo lost, no iso seen.

I did not come upon any duplicate of the only collection ever cited under this name. Merrill compared it with *R. cumingii* Kuntze, which is not a well-known species either. Prominent features seem to be, according to Merrill's description: Leaves sharply acuminate, venation subparallel, no woolly felt on lower surface. Inflorescence up to 20 cm, narrow, branches up to 3 cm, widely apart. Of the sepals no dimensions are given, petals are 4 mm long. Stamens many. Pistils few (usually 6 or fewer), ovary glabrous or with very few hairs, incl. style 2½ mm.

Maybe this was a male specimen.

R. gardnerianus Kuntze, Meth. Speciesbeschr. (1879) 42, '*gardenerianus*'.

The species was named by Kuntze after Mr. Gardner who described *R. macrocarpus* Gardn. 1847, non *R. macrocarpus* Benth. 1844. According to Kuntze he saw material from the continent but also (in W) a Cuming specimen from the Philippines, which I have not seen. Focke (1910) mentioned the species from Java on the basis of material identified by me as *R. chrysophyllus* Miq. *Rubus moluccanus* L. var. *gardnerianus* (Kuntze) Meeuse & Adelbert was erected for Javanese material which in my opinion belongs to var. *moluccanus*. The 'real' *gardnerianus* does not occur in Malesia.

R. glomeratus Bl. var. **griseolus** Focke and var. **pileanus** Focke, Bibl. Bot. 72 (1910) 91.

See note 8 under *R. glomeratus* Bl., p. 381. Focke did not mention specimens.

R. grewiaefolius Koord. (in herb.) ex Focke, Bibl. Bot. 72 (1910) 67. — Type: a specimen collected by Koorders in Menado, Celebes.

I did not see any specimen with this name. According to Focke the species resembles *R. pyrifolius* J.E. Smith.

R. guttans Focke, Bot. Jahrb. 54 (1916) 70; van Royen, Phan. Monogr. 2 (1969) 95, f. 25. — Type: *Ledermann 12054*, probably lost, not seen by Van Royen or me.

Van Royen is of the opinion that *Brass 23597* agrees best with Focke's description which mentions the leaves as having a truncate base and a caudate apex. In my opinion *Brass 23597* belongs to *R. moluccanus* L., nearest to var. *moluccanus* but certainly not a typical representative of this variety. The other three specimens cited by Van Royen under *R. guttans* are different from each other in leaf-shape and indument and I have placed them in three different varieties of *R. moluccanus*. *Rubus guttans* must be considered a nomen dubium, in the absence of a type specimen.

R. koordersii Focke, Bibl. Bot. 72 (1910) 100. — Type: *Koorders 18568* from Menado, Celebes.

The collection was seen in L, it consists of one branch of *R. elongatus* J.E. Smith and some loose leaves of *R. moluccanus* L. var. *discolor*. The description mentions young fruits, which are wanting on the sheet.

R. peltinervius Focke, Bibl. Bot. 72 (1910) 94, f. 39. — Type: Focke mentioned a specimen cultivated in Hort. Bot. Bogor. I did not see such a specimen. Also mentioned by Focke (paratypes) are: *Nagel 367* from Java (seen from B) and *Teijsmann 8496* from Borneo (seen from BO).

The description and the photograph given by Focke agree with the Nagel specimen I saw. *Teijsmann 8496* is *R. moluccanus* L. var. *angulosus* and does not look very much like the Nagel specimen. The latter is certainly not a common var. *angulosus*: it has small leaves of 6 by 5 cm at most, with appressed hairs on the lower leaf-surface (apart from the woolly felt). It combines characters of var. *angulosus* (overlapping leaf-bases) and var. *discolor* (appressed hairs, little lobed leaves) and might be a hybrid. The small leaves are exceptional and below the normal range of either. According to Focke the cultivated type specimen had leaves of 10 by 8 cm which would come within the range of both.

R. pyrifolius J.E. Smith var. *floccosus* Focke, Bibl. Bot. 72 (1910) 66. — Type: Koorders specimen, number not mentioned, collected in Besuki, Java, not seen.

R. pyrifolius J.E. Smith var. *multiserratus* Focke, l.c. 65. — Type: not mentioned, from Java, not seen.

R. reinwardtii Kuntze, Meth. Speciesbeschr. (1879) 56, 76. — Type: a Kuntze specimen from Mt Pangrango, Java, at 2300 m, not seen.

According to Kuntze this is to be distinguished from *R. chrysophyllus* Miq. by its short stalked glands especially in the inflorescences. I did not come across any *chrysophyllus* specimens with glands.

R. vanoverberghii Merr., Philip. J. Sc. 9 (1915) Bot. 448; Enum. Philip. Flow. Pl. 2 (1923) 230. — Type: *Vanoverbergh 2683*, holo lost, iso seen in K.

The specimen seen agrees rather well with *R. glomeratus* Bl. See under that species, note 5, p. 380.

R. zambalensis Elmer, Leaflet. Philip. Bot. 2 (1908) 451; Focke, Bibl. Bot. 72 (1910) 62; Merr., Enum. Philip. Flow. Pl. 2 (1923) 231. — Type: *Curran & Merritt FB 8085* from Luzon, not seen, possibly lost.

The correct disposition of this name remains enigmatic. The type specimen obviously had only young flowerbuds and Elmer described them as placed in small glomerules and as subtended by a 4-lobed involucre, which seems rather strange.

INDEX OF SPECIFIC AND INFRASPECIFIC NAMES

Numbers and letters refer to numbers and letters of accepted species and varieties. Synonyms have = before the number of the species/variety to which they belong. An asterisk * before the number indicates a reference to a note, discussion, homonym, etc.; Incompl. and Dub. refer to the Incompletely known species and Dubious names at the end of the paper.

Dalibarda

latifolia Bl. = 7

pyrifolia (J.E.Sm.) Bl. = 7

Rubus

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alceifolius Poir. 16, *19

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var. genuinus Hochr. = 16

alpestris *1

angulosus Focke = 14d

angulosus Gremli *14d

battakensis Ridl. = 14a

beccarii Focke 5, *4, *Incompl. 2

benguetensis Elm. 8, *7, *9, *11

blumei Focke = 2

brevipetalus Elm. = 7

bürgeri Miq. *17

calycinoides Hay. = 17

var. macrophyllus Li = 17

calycinoides Kuntze *17

calycinus D. Don *17

chartaceus Kuntze Dub.

chevalieri Card. *14

chrysophyllus Miq. 12, *13, *17,

*Incompl. 2, *Dub.

forma densiflora Kuntze Dub.

var. minor Kuntze *12

cumingii Kuntze 6, *3, *10, *Incompl. 2,

*Dub.

(Rubus)

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elmeri Focke = 17

elongatus J.E. Smith 2, *3, *4, *Incompl. 2, *Dub.

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var. forbesii Focke = 2

var. genuinus Hochr. = 2

var. laevicalyx Ridl. = 2

var. sericeus Ridl. = 20

var. subsinuosa Miq. = 2

var. tidorensis Focke = 2

elongatus auct. = 14b

fairholmianus Gardn. *14

fontinalis Kuntze = 14b

gardnerianus Kuntze = 12, *Dub.

glabriusculus Hassk. = 20

glomeratus Bl. 20, *14b, *Incompl. 3, *Dub.

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var. gracilis King 20, *14

var. grandiflorus Ridl. *14b

var. griseolus Focke *20, Dub.

var. pileanus Focke *20, Dub.

glomeratus auct. = 14a

grewiaefolius Focke Dub.

guttans Focke Dub., = 14

hallieri Focke = 14a

(Rubus)

- hamiltonii* Hook. f. *7
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 subsp. *dendrocharis* Focke = 14b, = 14c
 subsp. *edelingii* Focke = 14b
 subsp. *padangensis* Focke = 14b
hasskarlii auct. *14c
heterosepalus Merr. 13
hexagynus Roxb. *7
hillii F.v.M. *14, *14a, *15
indicus Thunb. *14
indiscissus Focke = 14b, = 14c
integrifolius Ridl. = 14c
keleterios v. Royen 15, *Incompl. 1
koordersii Focke Dub.
korinchensis Ridl. = 7
laciniatostipulatus Koidz. = 16
latifolius Bab. *7
latifolius Kuntze = 7
ledermannii Focke = 20
 var. *beleensis* v. Royen = 20
lineatus Bl. 1, *Incompl. 3
 forma *pulcherrima* Focke = 1
 var. *angustifolius* Hook. f. = 1
 var. *diengensis* Focke = 1
 var. *glabrior* Hook. f. = 1
lobbianus Hook. = 2
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 var. *austropacificus* v. Royen = 14a
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 var. *dendrocharis* (Focke) v. Royen = 14c
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 *Dub.
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 var. *fontinalis* (Kuntze) Kuntze = 14b
 var. *gardnerianus* (Kuntze) Meeuse &
 Adelb. = 14a, *Dub.
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 var. *glomeratus* (Bl.) Backer = 20, *14

(Rubus moluccanus)

- var. *hasskarlii* (Miq.) Kuntze = 14b,
 = 14c
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 var. *malvaceus* (Focke) Backer = 19, *14
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 var. *ochrascens* = 12, *14
 var. *pseudotiliaceus* (Kuntze) Kuntze
 = 14b
 var. *pyrifolius* (J.E.Sm.) Kuntze = 7
 var. *rotundifolius* (Miq.) Kuntze = 7
 var. *thespesiaephyllus* v. Royen = 14b
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